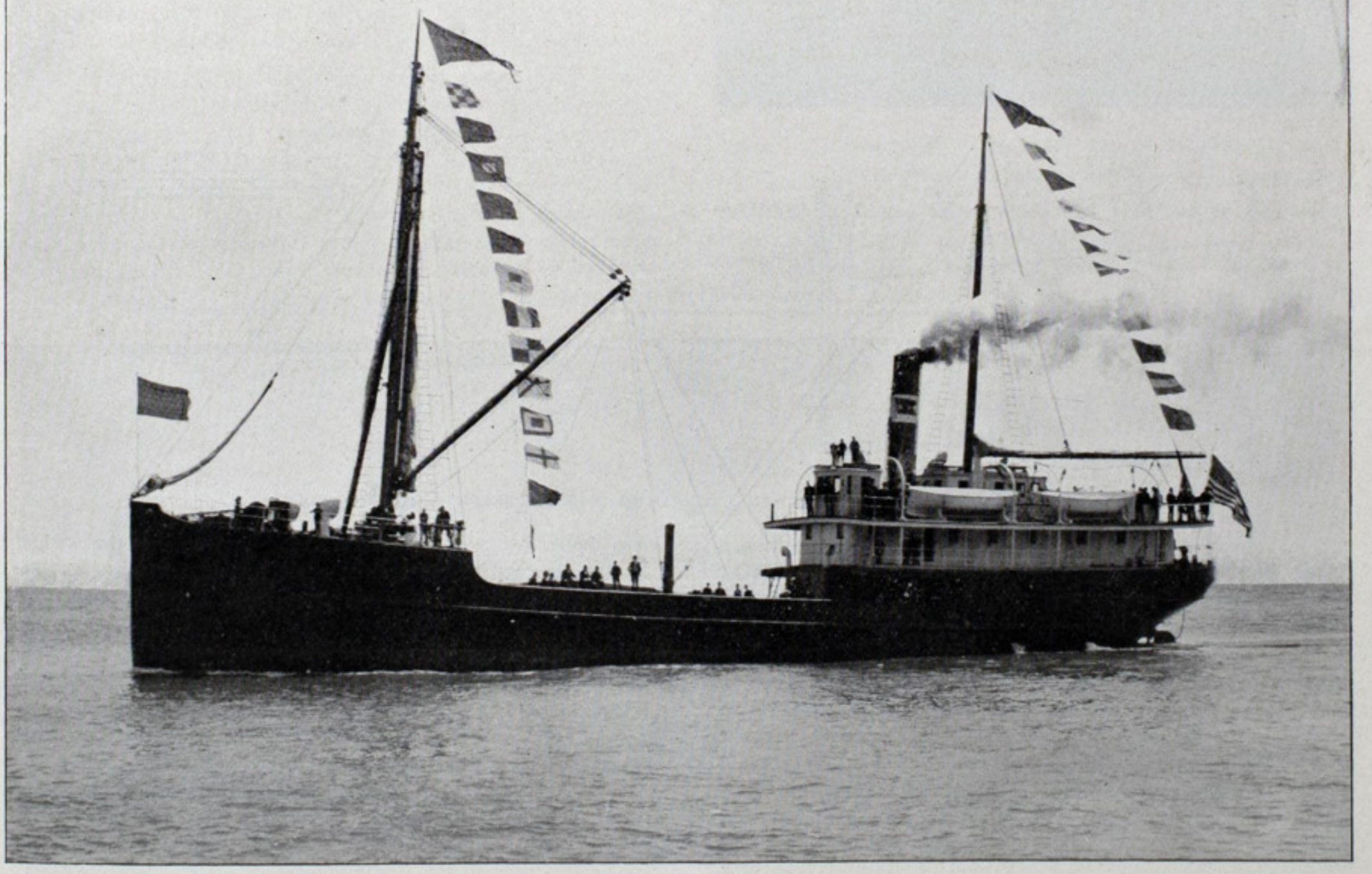
VOL. XXIX. CLEVELAND, O., JUNE 9, 1904. No. 23.

LAUNCH OF NUSHAGAK.

The United Engineering Works, San Francisco, Cal., recently launched the steamer Nushagak. She is 180 ft. over all, 175 ft. between perpendiculars, 33 ft. 8 in. beam and 14 ft. 6 in. deep. Her displacement, loaded, is 1,600 tons and her speed, loaded, 10½ knots. Her engines are three-cylinder, triple-expansion with cylinder diameters, 14, 22½ and 38 in. by piston stroke of 30 in. The indicated horse power is 650. Steam is supplied by two Scotch boilers, allowed a working pressure of 180 lbs. per square inch. Her steam steering gear is of Williamson Bros. make and she is classed 100 A. 1 in Lloyds.

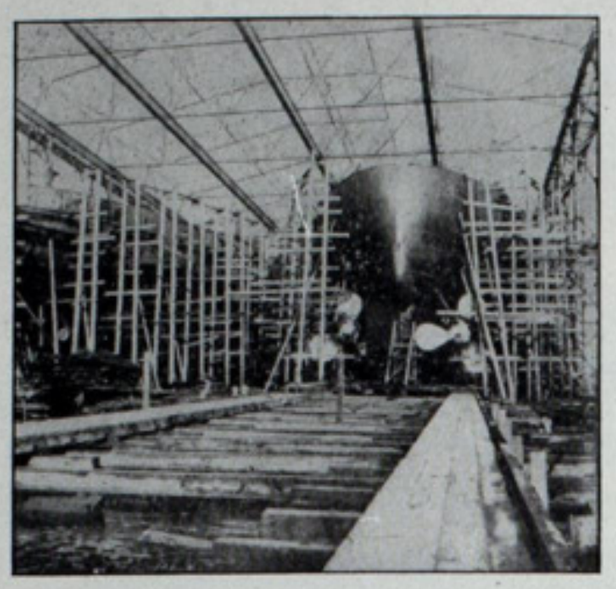


STEAMER NUSHAGAK.

[*Built by The United Engineering Works, San Francisco, Cal.*

The four-masted schooner Lewis Bossert, built for Lewis Bossert & Son, New York, was launched from the Kelley-Spear Co.'s yard, Bath, Me., last week. She was named by Miss Nellie Fletcher of Brewer, Me. She is designed especially for the lumber trade.

LAUNCH OF BATTLESHIP RHODE ISLAND.



RHODE ISLAND ON THE STOCKS.

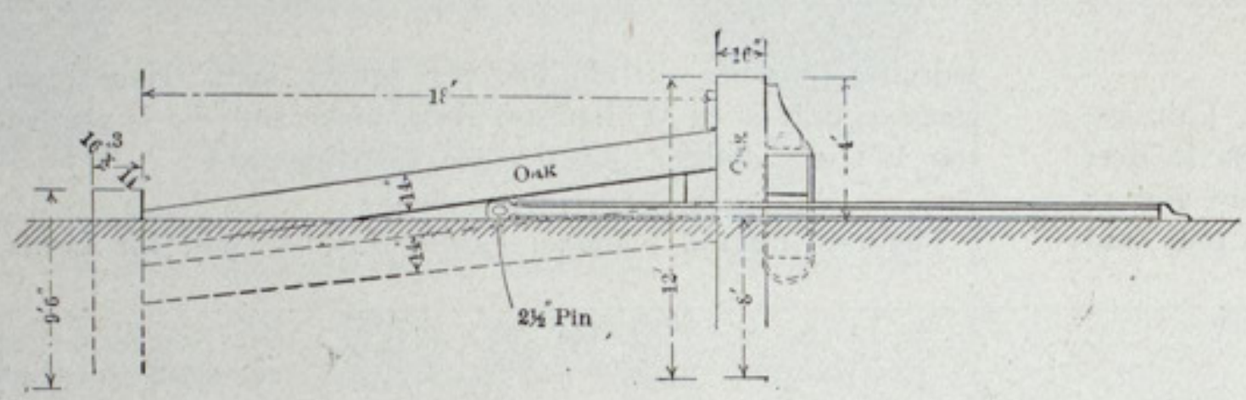
Great credit is due the management of the Fore River Ship & Engine Co., Quincy, Mass., for the successful launching of the battleship Rhode Island on May 17. A strike of 2,600 men on April 18 made the scheduled date, April 30, out of the question for launching, but with only two weeks postponement the company succeeded in taking out packing and slidingways, greasing groundways, replacing slidingways and packing, installing a stopping device, completing necessary iron work and finally launching a 435-ft. battleship weighing 6,500 tons. It is not the purpose of this article to go into the labor question but to deal with the mechanical features of the launching.

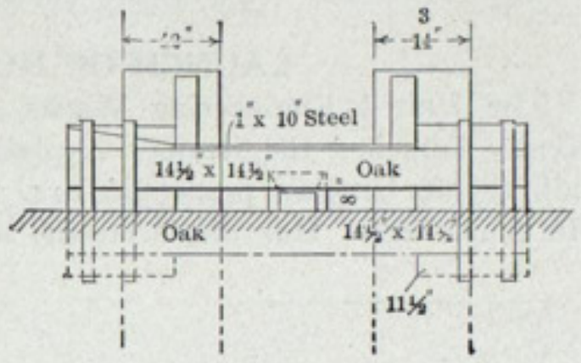
The Weymouth Fore River at the point opposite the location of the Fore River Ship & Engine Co. is of such width and depth that it is necessary to stop a vessel the size of Rhode Island before she can go twice her length from the ways. To accomplish this, the company decided to adopt a system of rope stops and wedges in conjunction with two 7-ton anchors of the Navy type. The mask, stopping device, used in most launchings in France, was not considered as having sufficient power to check such a great weight and, together with several other suggested methods, was not seriously considered.

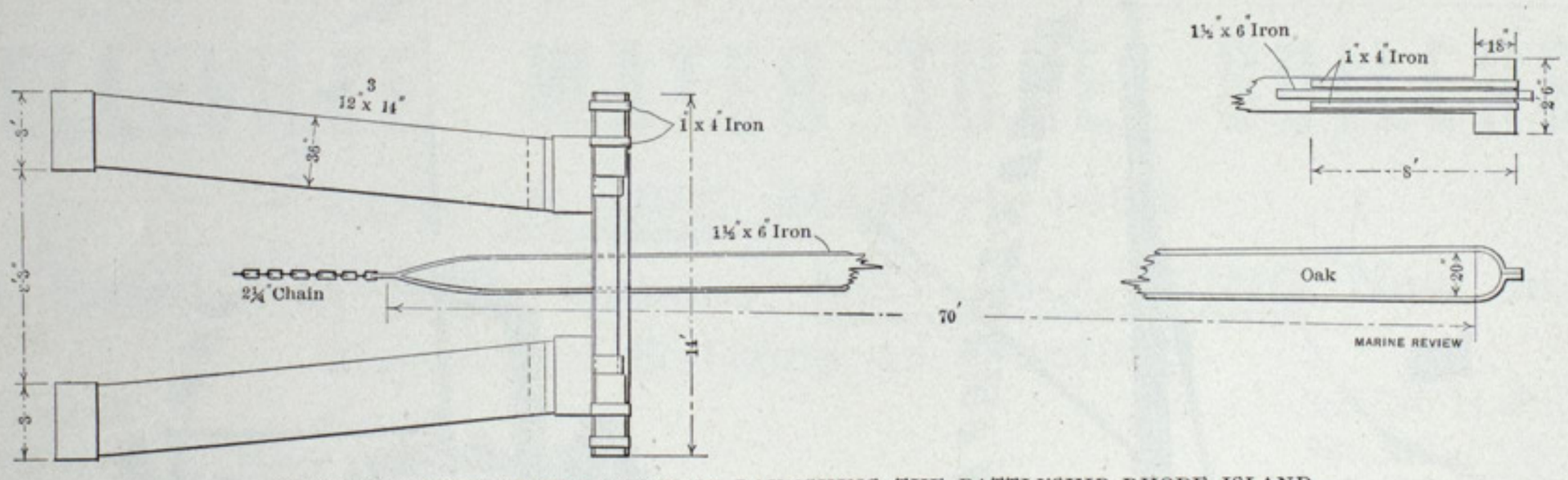
At 6 a. m. the greasing gang began to apply pure tallow on the launchways, at their extreme outboard ends working toward the shore as the tide came in. Early in the forenoon the wedges were rallied up by 400 men and the after keel blocks for some 60 ft. forward were split out. Oak trip-shores being substituted.

At 11:30 o'clock the wedges were given a final five-minute rallying with rams after which sixty-four men went under the bottom and split out all remaining keel blocks while on the outside of the ways the shores were removed as rapidly as the men below advanced with the keel blocks. This work was all done in a very creditable manner considering the great lack of experience on the part of 96 per cent of the 400 mechanics. At 12:30 the sole pieces were the only tie holding slidingways to the groundways and two 8-ft. crosscut saws were rapidly severing these, and at 12:35 she tore the slidingways free and with champagne dripping from her massive prow she slid smoothly into the water to the music of cheering men, whistling tugs and parting manila lines.

The accompanying drawing will illustrate the stopping-wedge device. The heel of the wedge, 20 in. by 20 in., tapering to 6 in. at point. From the forward hawse pipe a 2¼-in. chain was led aft, suspended from the rail by manila lines, 358 ft. to the outward end of a 100-ft. ground chain which





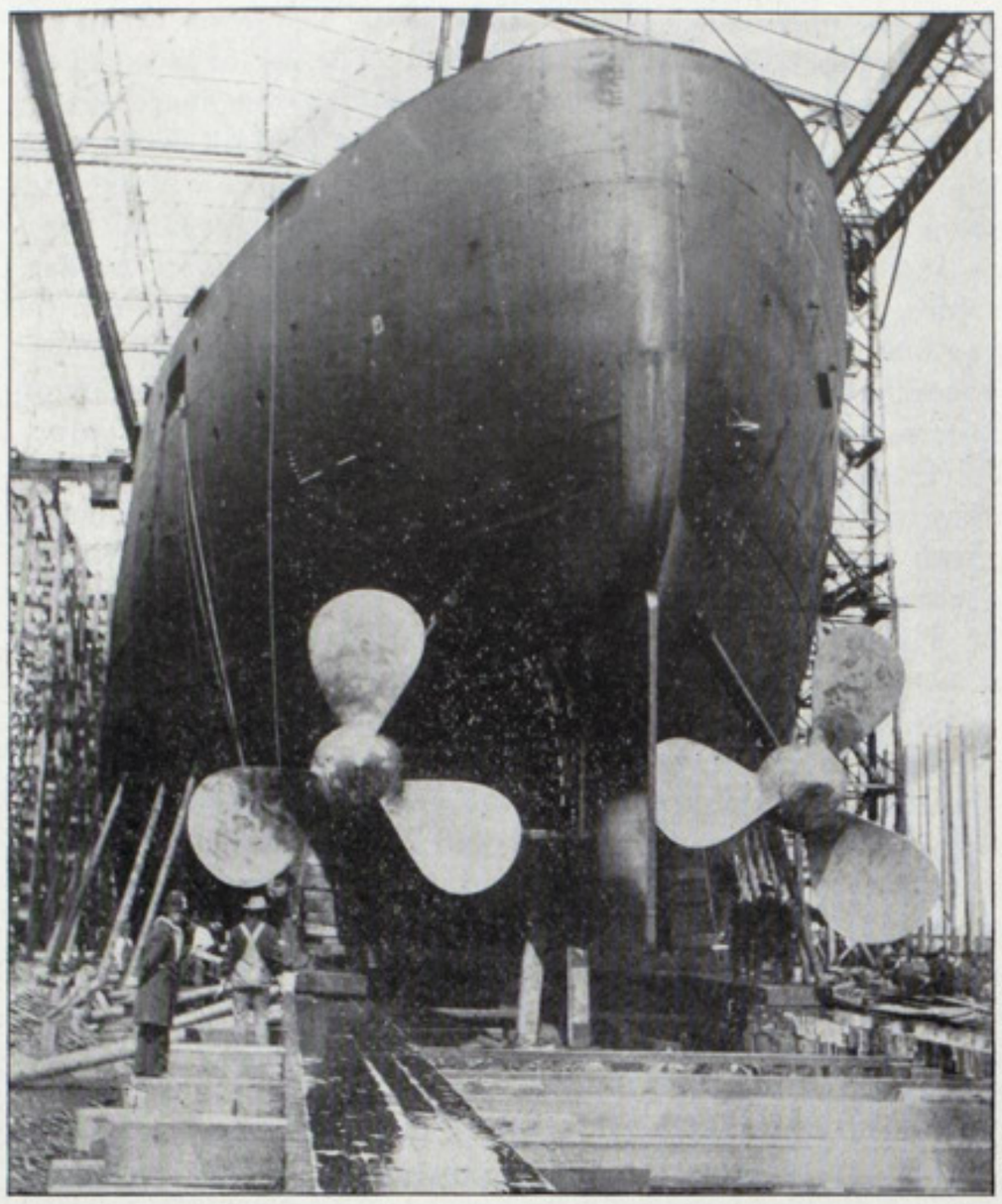


STOPPING WEDGE DEVICE USED IN LAUNCHING THE BATTLESHIP RHODE ISLAND.

was made fast to a dead-man buried just outside the wedge. It was attached to the ground chain by forty-seven 7-in. rope stops spaced 46 in. apart and from these it continued to the nose of the wedge.

Just at the moment the vessel plunged clear of the ways the stops began to strain and part at the same instant two 7-ton anchors were dropped from the second hawsepipes. The impetus gathered by the ship was tremendous, the forty-seven stops on each side parted on the run, the two 70-ft. oak wedges were torn smoking through their resistance frame till they brought up against the braces snapping one of the 2¼-in. chain cables, but the momentum was checked sufficiently to prevent the vessel grounding on the opposite bank. In swinging with the tide she did, however, ground slightly. It is probable that had the cables to the anchors had less scope these would have stopped her still shorter and she would have swung clear. This ship is farther advanced than any of her class 59.8 per cent.

The following figures will be of interest: Length, 435 ft.;



STERN VIEW OF THE BATTLESHIP RHODE ISLAND.

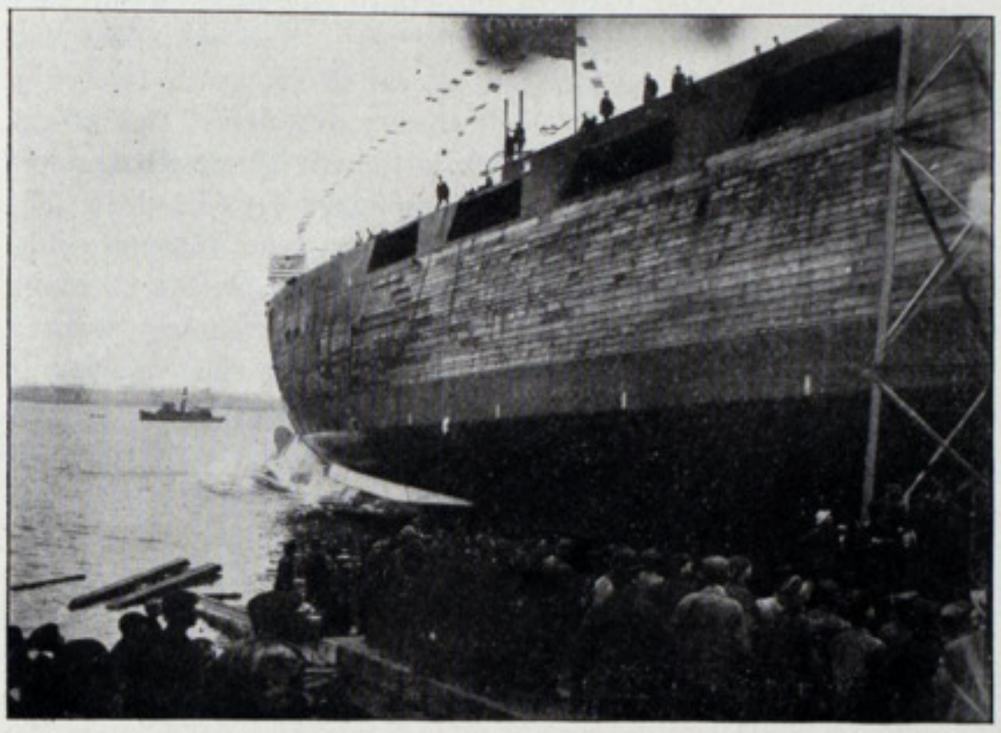
[*Built by the Fore River Ship & Engine Co., Quincy, Mass.*

breadth, 76 ft. 2½ in.; launching weight, 6,500 tons; length of ground ways, 600; length of sliding ways, 370 ft.; width of sliding ways, 3 ft. 9 in.; width of ground ways, 4 ft.; descent of ground ways, 11-16 in. to the foot; inward slope of ground ways, ⅜ in. to the foot; lubricant under sliding ways, 2-3 tallow, 1-3 lard oil; lubricant outboard from ways, pure beef tallow; lubricant under sliding ways was placed three weeks, five days before launching, remained in fine condition although the temperature was such on two days that water was used to cool the ground under and about the ways; eighteen hours before launching ½ bbl. of hot tallow was injected under sliding ways.

CHARACTERISTICS OF THE RHODE ISLAND.

The general dimensions and chief characteristics of the Rhode Island are: Length on load waterline, 435 ft.; breadth, extreme, at load waterline, 76 ft. 2½ in.; trial displacement, about 14,948 tons; mean draft at trial displacement, about 23 ft. 9 in.; greatest draft, full load, about 26 ft.

In the 15,000 tons represented in each of these vessels, the many antagonistic qualities essential to a perfect fighting machine have been compromised and incorporated in proportion which experience seems to have pointed out as the most desirable and efficient. To begin with, these battleships will have a speed of at least 19 knots, which compares most

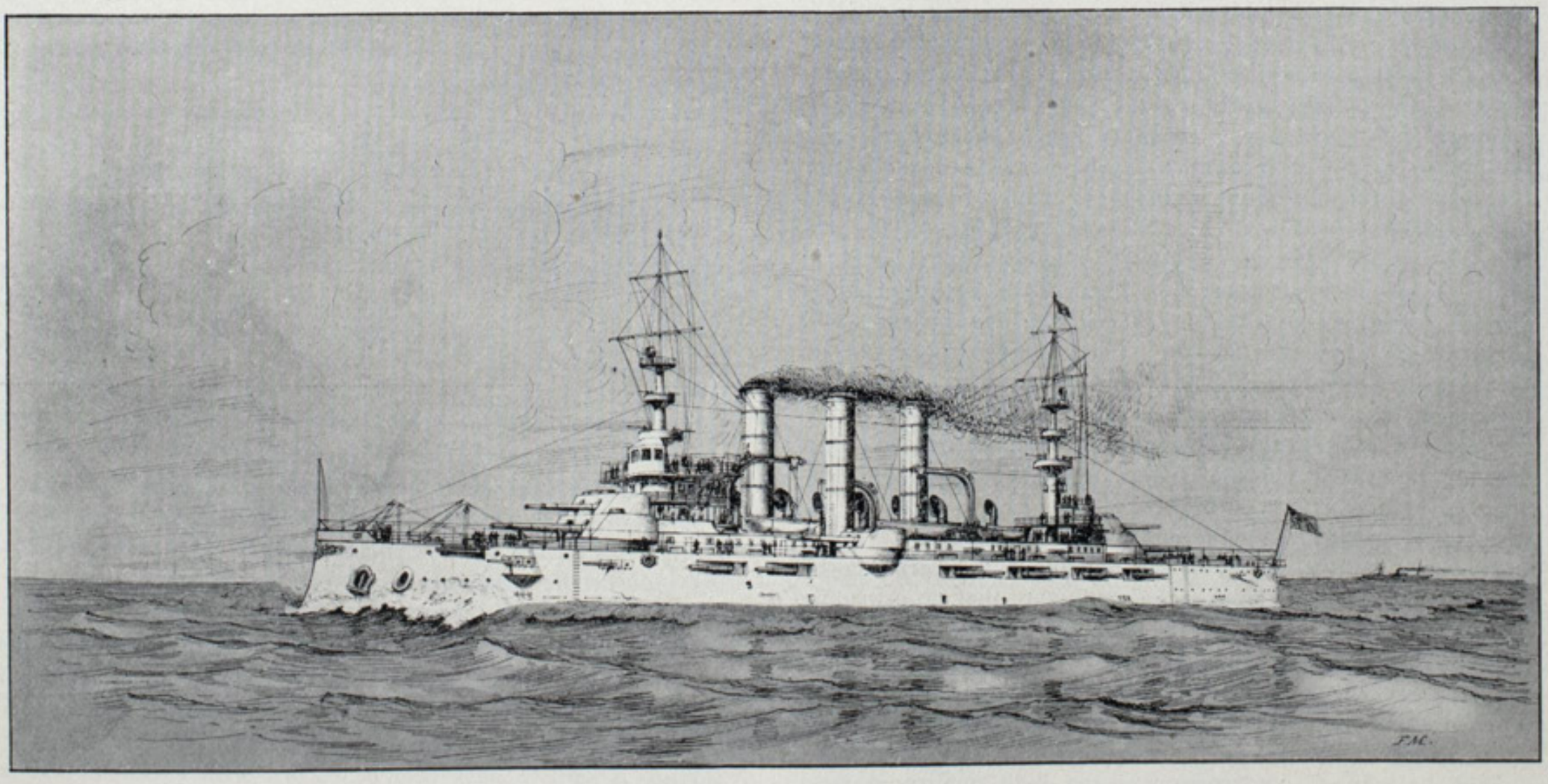


LAUNCH OF BATTLESHIP RHODE ISLAND.

[*Built by the Fore River Ship & Engine Co., Quincy, Mass.*

favorably with any battleships under construction abroad, as well as with any in the projected stage.

The Rhode Island will be propelled at this high speed by twin-screws driven by two four-cylinder, triple-expansion



BATTLESHIP RHODE ISLAND, AS SHE WILL LOOK WHEN COMPLETED.

[*From a sketch prepared by the Navy Department.*

engines of about 19,000 I. H. P. having a stroke of 4 ft., running, under conditions of maximum speed at about 120 revolutions per minute. The steam necessary to this power will be supplied at a pressure of 250 lbs. per square inch, by twenty-four Niclausse watertube boilers, placed four in each of six independent watertight compartments. The Rhode Island will carry four 12-in. guns, forty calibres in length, mounted by pairs in balanced turrets, one turret being located forward of the superstructure, and the other aft, and each having a total arc of train of 270°. Of the eight 8-in. guns, 45 calibres in length, which will be carried on this vessel, four will be mounted by pairs in turrets, superposed upon the 12-in. turrets above mentioned, and four in two broadside turrets slightly forward of amidships, the amidship turrets having a total arc of train of 180°. In the Rhode Island there will be a broadside battery on the gun deck of twelve 6-inch rapid-fire guns, fifty calibres in length, mounted 6 on each side, each with a total arc of train of 121°. The secondary battery will consist of twelve 3-in. 50-cal. R. F. guns, twelve 3-pdr. semi-automatic, eight 1-pdr. heavy automatic, two 30-cal. machine guns and six 30-cal. Colt automatic guns, all mounted in commanding positions and having large arcs of fire. The Rhode Island will also be fitted with submerged torpedo tubes.

The magazines will be specially fitted to enable her to carry, with absolute safety in all climates, the new smokeless powder. Provision will be made in the magazines for the stowage of at least sixty rounds for each of the 12-in. guns, 125 rounds for each of the 8-in. guns, 200 rounds for each of the 6-in. guns, 300 rounds for each of the 3-in. guns, and a plentiful supply of ammunition for the smaller guns.

So much for the vessel's offensive qualities. To make her defensive qualities proportionately great, she will be provided with a complete waterline belt of armor, 8 ft. in width amidships, 11 in. thick at the top and 8 in. at the bottom, tapering to a uniform thickness of 4 in. at the ends of the vessel. She will also have a casemate armored belt extending over about 245 ft. of her length, of a uniform thickness of 6 in., rising from the top of the main belt to the upper or main deck, and joined at its after end to the barbette of the 12-in. turret by a 6-in. armored bulkhead, and having at its forward end an armored bulkhead of 6 in. thickness extending from side to side, thus forming a citadel or redoubt within which the 6-in. guns will be mounted. Within this citadel or redoubt, and extending from the forward turret to the after turret, light armor 1½ in. and 2½ in. in thickness, will form subdivisions of the gun enclosures, thoroughly protecting the gun's crews from flying splinters and fragments of bursting shells. The barbettes for the turrets of the 12-in. guns are to be 10 in. in thickness for that portion outside of the redoubt or citadel, reduced to 7½ in. in thickness within. The turrets themselves will be protected by armor 12 in. in thickness. The 8-in. turrets will, in all cases, whether superposed or independent, be protected by 6 in. of armor, with 6½ in. port plates, and their barbettes will be protected by similar armor. The conning tower and its shield will be 9 in. in thickness, and the armored tube, 5 in. thick, will be of sufficient size to receive all voice pipes, wiring, etc. In addition to the conning tower, there will be, aft, a second tower known as the signal tower, which will be constructed of 5-in. armor. From the bottom of the waterline armor belt there will rise a curved turtle-backed nickel-steel protective deck 1½ in. thick on the flat and 3 in. thick on the sloping sides, to make assurance doubly sure that no projectile of the enemy finds its way into the vitals of the ship. As an additional protection to stability, a cofferdam belt, 3 ft. in thickness and packed to a density of 8 lbs. to the cubic foot, will be worked along the two sides, above the protective deck, for the entire length of the vessel.

The material of construction is the high quality of steel which has entered into all the vessels of our navy. The main or upper deck, in addition to being built of steel, will be the only one upon which wood is to be laid. The lower decks will all be of steel, covered with linoleum. The use of wood in the construction of this vessel will be limited even more strictly than it has been in the later battleships, and all wood-work above the protective deck, except deck plank, will be fireproofed. Bilge keels and heavy docking keels are fitted.

It is proposed to make all of the vessels of this class flagships, and to do this it is necessary to make provision for the accommodation of one flag officer, one commanding officer, one chief of staff, nineteen ward-room officers, ten junior officers, eight warrant officers and 772 crew, including 60 marines, making a grand total of 812. Both officers and crew will have wash rooms, bathrooms, and other similar conveniences such as will place the comfort and healthfulness of these vessels very high in the scale.

The applications of electricity on board are very much wider than in the case of any other battleship in existence, with the possible exception of the Kearsarge and Kentucky. All of the turrets have electrical turning gear, and the ammunition hoists, blowers to the turrets and general ventilation, the general workshop, and practically all of the auxiliaries, outside of the engineers' department and excepting capstan and steering gear, are to be electrically-driven. To provide for the power required for these purposes, there will be installed eight engines and dynamos, mounted on combination bed-plates, two having a rated output of 1,250 amperes at 125 volts, and six with 625 amperes at 125 volts.

In this class of vessels, all of the latest approved equipment will be provided for accommodation of the officers and crew, the ventilation and drainage being of a high standard; the hospital quarters airy and commodious; the bakery and galleys, with their issuing rooms and refrigerating plant, having been worked out with a view to thorough efficiency; laundry and drying rooms are fitted with the latest machinery, electrically-driven; and the living quarters are carefully protected by insulation from cold in winter and excessive heat in summer. Take it all in all, the designs of the Rhode Island class embody the latest developments in naval architecture, and these vessels will prove most formidable additions to the fighting strength of the navy.

SHIP BUILDING DURING MAY.

The bureau of navigation reports 104 vessels of 41,142 gross tons were built in the United States and officially numbered during May as follows:

	Wood.				Steel.				Total.	
	Sail		Steam.		Sail.		Steam.			
	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.
Atlantic & Gulf	21	1.899	28	2,241	1	4,167	9	10,095	59	18,402
Porto Rico.	..	.....	..	..	....	.. ....	....	. ....	....	.....
Pacific	4	864	8	531	...	....	...	.....	12	1,395
Hawaii	..	.....	1	8	...	.....	..	....	1	8
Great L'k's	....	. ....	4	61	....	.....	6	20,738	10	20,799
Western Rivers		....	22	538	....	.....	....	....	22	538
Total	25	2,763	63	3,379	1	4,167	15	30,833	104	41,142

The largest steel steam vessels included in these figures are: The Augustus B. Wolvin, Francis Widlar, R. W. England and Utica, built on the great lakes; and the C. W. Morse and Boston, built on the coast.

The annual report of Messrs. John J. Thornycroft & Sons, the manufacturers of torpedo boats, states that a large sum has been expended in establishing a new branch of the business for the supply of motors for marine purposes. This departure is said to have been rewarded with excellent results, and it is expected the experiment will prove of a profit-earning character.

LIVERPOOL SHIPPING LETTER.

Liverpool, May 23.—Lord Inverclyde's letter exposing the methods resorted to by the German steamship lines in trying to divert Cunard passengers from Russia, Austria, and Hungary to their own steamers while crossing Germany on their way to ports of embarkation, has called forth a reply from Herr Ballin, the director-general of the Hamburg-American Line. Dr. Ballin endeavors to show that he has gone out of his way to try to come to an agreement with the Cunard company in regard to the European emigrant traffic, but without result, the Cunard Line having apparently, he says, "come to the conclusion that now they have the support of the British government, they can afford to be unreasonable, and make demands they would never have dreamt of if, like my company, they had to depend on their own efforts, and could not rely on government support." Under these circumstances, Herr Ballin goes on to say, "we have no alternative but to try and secure a share of that Scandinavian and British emigrant business of which British lines have hitherto enjoyed a monopoly, and although the public may for some time be provided with very cheap fares to America, I fear neither the Cunard shareholders nor our own will consider themselves advantaged." As to the charge that Cunard passengers have been interfered with and sent back at German control stations, Herr Ballin offers little or no explanation, except that if the present differences between the lines can be adjusted, he is willing to undertake that the German regulations at the control stations shall not interfere with the Cunard passengers any more than they do with those traveling by the German steamers. Evidently he adjudges the government officials at fault, for he asserts that he could produce fifty such declarations as that made by the Cunard Line showing that the gendarmes in Hungary have forced passengers holding tickets by the German lines to give them up and compelled the passengers to travel by Cunard steamers against their will. The situation thus created would appear to threaten a rate war, and very severe competition for the American emigrant traffic. Herr Ballin also seems to be putting his scheme into immediate operation if the statement is correct that arrangements have been made for conveying passengers from Britain via Antwerp and thence to New York by the Red Star Line steamers at a rate as low as $12.50. The progress of events in this controversy is being watched with much interest here.

I have an official communication from the Cunard Steamship Co. which is to the effect that the directors have completed arrangements with Mr. Marconi, whereby the latter undertakes to provide by wireless telegraphy 200 words of news matter daily to the liners while they are steaming across the Atlantic. The "Cunard Bulletin" which has been published on board these steamers for many months past, has always obtained the latest news a day or two before reaching shore on either side, and often important messages by Marconigrams have been received at sea from passing liners. Commencing next month, however, the Bulletin is to be issued daily, and will contain the latest news in each issue, thus becoming in a miniature way a daily ocean newspaper. Mr. Marconi during his passage from Liverpool to New York aboard the Campania last week is said to have satisfied himself by continued experiments of the practicability of the scheme, and that messages can be despatched and received at any time while crossing the Atlantic. Henceforth, therefore, business men traveling by the Cunard steamers will be able to keep in daily touch with whichever market they are interested in.

By the joint efforts of the parliamentary committee of the Chamber of Shipping and the Liverpool Steamship Owners' Association, together with the shipping members of parliament, it is understood that a satisfactory compromise has been arrived at between the Liverpool Atlantic steamship lines and the British government in regard to the provisions of the aliens' bill. As at present drafted, the bill will interfere with "transmigrants" by enforcing a vexatious inspection of all aliens on their way through Liverpool from the continent of Europe for the United States by British steamers, but by the concessions which have been obtained, these emigrants will be exempted, and this will be made clear when the bill comes on for the next reading.

Next Thursday, has been fixed for the first conference of delegates of the International Sailing-Ship union, and will be held in London. The union has now been formed and, among other things, the delegates will be called upon to fix a minimum freight, applicable to sailing-ship owners in Britain, France and Germany, in order to prevent the cutting competition which in recent years has proved so disastrous to British and foreign sailing-ship owners alike. At present freights are said to be ruinous and the promoters of the newly-formed union still hold to the opinion that a combination, such as this, can alone raise them to a profitable level. Happily for its success, the union has behind it 75 per cent of the sailing-ship owners of Britain, France and Germany.

It may interest some of your readers to know that a record shipment of apples from Tasmania, of 45,000 cases, is about to arrive in London by the White Star liner Medic. The Tasmania apple crop this season is said to be abundant, totalling 600,000 bushels, and as the American and Canadian varieties have about ceased to arrive, Tasmanian apples for a season will be able to command the British market. In this connection, the Cufic, the first of two new cargo steamers added by the White Star Line to their Australian fleet, left Liverpool today for Albany, Adelaide, Melbourne and Sydney. She will be followed by the Tropic on July 16. These two fine cargo vessels, of 8,500 tons each, will raise the White Star Australian fleet to seven passenger and cargo vessels, varying in the case of the passenger vessels, from 11,900 to 12,500 tons. Liverpool now has unrivalled steamship communication with Australasia.

At the annual meeting this week of Messrs. John I. Thorneycroft & Co., Ltd., the well known British firm of torpedo craft builders, Mr. William Beardmore, the chairman, said the naval conflict in the Far East had shown that torpedo boats and destroyers did take, and would take, a prominent part in the armament of modern navies, and as boats built by their firm had taken a leading and successful part in the war, they had every reason to look forward with confidence. The contracts in hand included four torpedo boat destroyers for the British government. A great deal of time had been spent in trying to secure orders for destroyers from foreign governments, but little success had been met with.

As showing the importance of this port in the live stock trade, it has been pointed out by the chairman of the animal and meat trade section of the Liverpool Chamber of Commerce that of the total importation of 876,000 live animals during 1903, Liverpool's share was 457,021, and London's, 302,798. No record is kept of the total imports of dead meat, but it is stated that just as large a proportion of this trade finds its way to Liverpool. In support of the above, I am able to give the following particulars of imports from North and South American and Canadian ports entered at Liverpool for last week. The Arabic, with 2,226 qrs. of beef; the Etruria, with 1,698 qrs. of beef; the Banffshire, with 29,504 sheep carcases and 5,017 qrs. of beef; the Republic, with 1,622 qrs. of beef; the Oceanic, with 4,108 qrs. of beef; the Kastalia, with 362 cattle and 133 sheep; the Sagamore, with 727 cattle, 1,352 sheep, and 2,175 qrs. of beef; the Cevic, with 890 cattle, 1,393 sheep, and 5,426 qrs. of beef; the Haverford, with 826 cattle, and 1,138 qrs. of beef, and the Sylvania, with 847 cattle, 765 sheep, and 1,378 qrs. of beef, making a total of 3,652 cattle, 3,553 sheep, 29,504 sheep carcases, and 24,828 qrs. of beef.

SHIPPING NOTES FROM SCOTLAND.

Glasgow, May 23.—The recent depressed and only partially restored condition of the ship building industry is reflected in the reports of the trade unions. The A. S. E. report for the first quarter of the year states that the total funds now stand at £602,540 17s 10¼d as compared with £602,860 18s 11d at the end of December. The general fund is down from £401,-644 0s 5½d to £394,880 17s ¾d and the superannuation reserve up from £201,216 18s 1½d to £207,660 0s 9½d. Donation benefit cost £31,269 16s 7d; sick, £13,471 17s 5¾d; superannuation, £26,248 2s 10d; and funeral £3,964 17s; and there was expended from the contingent fund £1,350 13s 1d and from the benevolent fund £1,027 16s 8d. The Court of Appeal which sat at Newcastle nearly all last month to consider the protest of the Glasgow district over last year's wages troubles, has decided that the men are entitled to out-of-work pay but not to strike benefit nor to federation benefit. The Society of Boilermakers and Iron Shipbuilders had on hand at the end of the first quarter of this year a balance of £385,462. This is a decrease on the three months of £11,961, the largest in any one quarter since the beginning of the present depression in trade. In many directions, the executive state, can be heard jubilant statements that the depression is at an end. "We sincerely wish such was actually the case but with a decrease that more than equals the decrease in either half-year of 1903 we cannot joint in the chorus of jubilation that proclaims the commencement of another era of great prosperity. That there is an improvement on the beginning of the year is undoubtedly a fact but the first quarter of this year must be written down as the worst quarter during this existing depression." The arrears are given as £8,303, an increase of £130 on the preceding quarter. The membership is now 48,373.

The ship building firm of John Shearer & Sons here have opened a new marine dock at Elderslie, Glasgow. The river steamer, Juno, was the first to be berthed in the dock, and as she passed in the superintendent broke a bottle of champagne on the dock head to formally celebrate the opening of the dock. The steamer was floated in, the caisson shut, and pumping operations begun, within the space of fifteen minutes. The pumps lowered the water at the rate of 2 in. per minute. The dry dock will accommodate the largest vessel that trades from the Clyde. The dock has a clear length of 594 ft. 9 in. from the inner side of caisson to face of cope at the dock-head. The depth of water on the sill is 20 ft. at high water of ordinary spring tides, 18 ft. 6 in. at high water of neap tides, and 8 ft. 10 in. at low water of ordinary spring tides. The difference between high water and low water levels, spring tides, is about 11 ft. 2 in. The width of the entrance is 68 ft. at cope level which is 8 ft. about high water. Access to the floor of the dock is obtained by means of four sets of stairs formed in the side walls. The pump house and entrance to the dock are founded on solid rock, but the greater part of the dock has been founded on very stiff dark-colored boulder clay. The sluice valves, three in number, are of cast iron with gun metal faces, and with clear openings—two of them of 6 ft. diameter and one of 3 ft. 6 in. diameter. The time required to open the 6 ft. diameter sluices will be about one minute. The entrance to the dock is closed by a floating steel ship caisson of rectangular transverse section. It has three docks the upper one of which carries the roadway while the other two divide the whole into three watertight compartments. The water capacity of the dock is about 4,800,000 gallons at high water, and it can be pumped dry in less than two hours.

This is the opening week of the Clyde yachting season. For a few years there was an experiment at an earlier start than had formerly been the case, but it had not a comparative success, and the Clyde program now begins with a gathering in Rothesay bay under the burgee of the Royal Northern Club on the 19th of May, early enough for the comfort of crews and the pleasures of yachting. Rothesay is this season to be left exclusively to the premier Scottish club, but the Royal Western Club have Hunter's Quay as headquarters, and for the present they have ceased official connection with Rothesay and Wemyss Bay. The incidence of Glasgow Victoria day falling upon Monday next has given them the opportunity of effecting a change in respect of their opening regatta, now fixed for that day instead of Saturday. This change will benefit the Northern whose cruise will go on undisturbed until Saturday evening, with the option of sailing leisurely back on Sunday; and upon the Western itself, for its regatta at Hunter's Quay on the 23d will be attended by all the yachts in commission.

A misfortune has attended the opening of the St. Lawrence season. The longshoremen's strike at Montreal last year was the cause of much delay. This year ice blocked the passage through the gulf to the upper ports, and many of the vessels with large complements of passengers were compelled to run to Halifax. Among the fleet thus delayed were the early departures from the Clyde-Allans' Corinthian and Donaldson's Salacia. These vessels are now on their way home about a week behind time, the former coming direct to Glasgow, and the latter via Liverpool, where she lands cattle. Owing to the disarrangement of sailings the Allan Line have despatched their Monte Videan as an extra vessel in their weekly service.

The P. & O. Co. have ordered from Barclay, Curle & Co., Whiteinch, a twin-screw steamer of 7,600 tons and 4,650 I H. P. The vessel is to be a duplicate of the Palermo launched from the same yard for the P. & O. Co. in May last year, and like her is to be built to the rules of the British Corporation Register.

The preparation of the cruisers of the Devonshire class for the heavier armament which they are to receive is costing a good deal of time and money, as can be seen by the condition of H. M. S. Carnarvon at Beardmore's yard here. On both sides a great deal of the structure has had to be taken down to make room for the stronger erections necessary to support the heavier guns. The same applies to the Roxburgh at the London & Glasgow Shipbuilding Co.'s yard, the Antrim at Clydebank, the Argyll at Greenock, the Hampshire at Elswick, and the Devonshire at Chatham dockyard—the amount of tearing down necessary in each case varying in accordance with the forward condition of each vessel.

The members of the Navy Boiler Committee, or some of them, have gone to Gibraltar to join the cruiser Hermes on the last experimental trip of the committee previous to the issue of their final report. The Hermes has now Babcock & Wilcox boilers, for which type and the Yarrow design the committee expressed a preference. A motion is to be made in parliament for a return from the secretary of the admiralty indicating how many miles each type of water-tube boiler has run in twelve months, how much fuel each has consumed, and how far the types recommended by the committee have proved superior to the Belleville and Thornycroft boilers which have been discarded by the committee. The questions involve considerable research, but the information would be interesting, and may bring an official pronouncement of the views of the engineering branch of the admiralty on the committee's recommendations. It would certainly be satisfactory if the engineering officers of the navy were permitted to offer their views on the work of the Boiler Committee before a professional audience.

The old-established joint businesses of Scott & Co. and the Greenock Foundry Co., ship builders and engineers at Greenock, of which the late Mr. John Scott, C. B., and Mr. R. Sinclair Scott were the sole partners, will now be conducted under the name of Scotts' Shipbuilding & Engineering Co.,

the interests and management remaining the same. None of the capital of the new company has been offered to the public.

The new Nelson Line steamer Highland Harris, built at Port-Glasgow by Russell & Co., has sailed on her maiden voyage for Buenos Ayres, Monte Video, and Rosario, via Liverpool. She secured a fair cargo here and the owners are now booking for the Highland Heather, the next new steamer of the line, which is to load out from Glasgow next month. The Cunard Line's twin-screw steamer Pannonia has left Glasgow, also on a maiden voyage. She takes up her station on the 28th of this month in the new Adriatic-Mediterranean-New York service, and will call at Trieste, Fiume, and Palermo on her westward run. The Donaldson Line despatch their large new twin-screw steamer, Athenia, on her first voyage, Montreal being her destination.

The recent launch of a dredger, Sir Harry Bullard, by Messrs. Ferguson Brothers was a novel event in Port-Glasgow, representing the beginning of a new branch of the ship building industry in that town. Another Port-Glasgow firm of ship builders several years ago went in for the partial construction of dredgers, but Messrs. Ferguson Brothers are the first to put into the water from a Port-Glasgow yard a dredger complete and ready for work. This firm intend to make a specialty of dredgers and tugs.

The steamer La Lorraine, from New York to Havre, brought specie to the value of £1,900,000 sterling, the largest shipment of gold ever insured in one vessel, and it taxed the insurance market to some extent, as great difficulty was experienced in completing the contract even by payment of an increased premium. In ordinary circumstances, specie shipments across the Atlantic can be insured at the low rate of 1s per cent but in this case the premium advanced to 2s 6d per cent, which proves that the market was glutted notwithstanding the popularity of this business. La Lorraine, which is also insured, is of nearly 11,900 gross tonnage, and is one of the steamers of the Compagnie Generale Transatlantique. When the P. & O. steamer Persia arrived at Plymouth last October, with gold from Bombay amounting to one million sterling, insured in London, it was looked upon as a remarkable event in view of the large insurance, but that voyage is beaten by the consignment by La Lorraine. Should a total loss of such a large insurable interest ever occur it would prove a disaster to the marine insurance world, and would take an age to redeem with the low premiums paid on specie risks.

Marine insurances are not effected on submarine boats, except during trial trips whilst under builders' contracts. But a vessel of this type, constructed in the United States, has been insured here for £40,000, against all risks incidental to transit across the Atlantic. This submarine is shipped at New York and carried on the deck of one of the steamers of the North Atlantic Steamship Co. (Ltd.). The actual port of consignment has not yet been declared here, but the terms of the insurance include the option of British or Continental ports. It is understood that the submarine is destined for the Russians, in which case the vessel will doubtless be delivered in the Baltic. For insurances of this character underwriters require a higher premium than that usually charged on tariff rates.

The Japanese navy has its own invention in use in "Shimose" powder, an explosive of enormous power. It is less destructive than American blasting gelatine, but exceeds the power of both gun-cotton and dynamite. A Shimose shell has been blown into between 2,000 and 3,000 pieces, and it is recorded that at Chemulpho, when the Russian ships were seeking to run the gauntlet of the Japanese squadron, a bluejacket on the Variag was struck by more than 160 fragments of a single shot. It is claimed that this explosive is intended less for the direct destruction of men than for the disablement of ships. It has been proved that a 6-in. shot fired at a coal store, protected by armor plate equal to that of a certain cruiser, made a hole 3 ft. in diameter and burst directly on contact with the plate. An ordinary shot made a hole of 6 in. only, and did not explode until it had passed 3 ft. beyond the plate, when it broke into ten or fifteen fragments.

A French writer discusses the speeds prescribed for French warships as compared with the results in British vessels. In the French battleships of the Patrie class 18 knots requires 1.18 H. P. per ton displacement, whereas the same speed is got with British vessels of the London class with less than 1 H. P. per ton. This is the recognised proportion for this speed in all the battleships built in this country, and the excess equal to 18 per cent in the French ship means a heavy increase in coal consumption. The case of the French ship, Suffren, is the proportion for 18 knots, being 1.27 H. P. per ton. In the new ships for Russia it is 1.23 and in the German ships of the Braunschweig type 1.21 H. P. per ton for 18 knots. In the Drake class of cruisers, of 23 knots designed speed but of 24 knots on trial, the proportion of power to displacement tonnage is 2.15 H. P. to 1 ton; in the new French cruisers of the Ernest Renan class to attain 23½ knots speed the proportion is 2.8 H. P. per ton displacement. The difference makes a material reduction in the radius of action. In the Jules Ferry cruisers the French model requires 2.3 I. H. P. per ton to get 22 knots; in the new British 22½-knot cruisers of the Duke of Edinburgh class the ratio is only 1.74 to 1. The French 12-knot cruisers require 2.1, the British 1.67. The cause is the continuous application in connection with British warships of Froude's system of tank experiments for proportioning and forming the model of ships, so as to ensure the minimum of resistance to propulsion at given speeds. The value of this has been fully established and confirmed in the long series of tests in connection with the evolution of the dimensions and form of the 25-knot Atlantic ships for the Cunard Co. Hence the value of model experiments in tanks. Immense sums in fuel alone may be saved by the solution of many problems common to all shipowners, yet they withhold support from the scheme for a national experimental department. It is difficult to understand the apathy of owners and builders in this matter. The proposed tank to be constructed at Bushy Park is in connection with the National Physical Laboratory, and is independent of the proposal to have a similar institution in connection with the Watt memorial at Greenock.

The stranding of the Allan liner Hibernian at Cape Ray on her voyage from Montreal to London suggests a probable heavy claim on underwriters here. The steamer is insured for £40,000 and the cargo for a good deal more.

PERSONAL.

The offices of T. R. McCarthy, steamship and freight broker, have been moved to 404 Board of Trade building, Montreal, Canada. Mr. McCarthy does a general business in chartering and forwarding and also in the sale, purchase and construction of steam and sail vessels.

Paul M. Mowry, who for the last three years has been connected with the Merchants' Trust Co. as adviser on industrial investments, has assumed the office of vice-president of the Engineering Company of America, No. 74 Broadway. Mr. Mowrey has been prominently identified with the engineering and contracting business since 1888, when he became connected with the Edison Illuminating Co. Among his numerous successful enterprises was the purchase and consolidation of the street railway and power companies of Richmond, Va., which were later turned over to Frank Jay Gould.

The hull of the steamer Pittsburg, which was burned at Sandwich, Ont., in 1902, has been raised for the purpose of being broken up.

MARINE REVIEW

DEVOTED TO EVERYTHING AND EVERY INTEREST CONNECTED OR ASSOCIATED WITH MARINE MATTERS ON THE FACE OF THE EARTH.

Published every Thursday by

The Penton Publishing Company,

CLEVELAND, OHIO.

CLEVELAND: WADE BUILDING.
CHICAGO: MONADNOCK BUILDING.
DETROIT: HAMMOND BUILDING.
NEW YORK: 150 NASSAU STREET.

Correspondence on Marine Engineering, Ship Building and Shipping Subjects Solicited.

Subscription, $3.00 per annum. To Foreign Countries, $4.50. Subscribers can have addresses changed at will.

The Cleveland News Co. will supply the trade with the MARINE REVIEW through the regular channels of the American News Co.

Entered at the Post Office at Cleveland, Ohio, as Second Class Matter.

JUNE 9, 1904.

The career of the giant steamer Augustus B. Wolvin will be watched with considerable interest during the present year as this steamer will undoubtedly break every cargo record that now exists on the great lakes. She has taken aboard 10,250 tons of soft coal at Lorain for her initial trip and it is expected that her initial trip of ore will be between 9,000 and 10,000 tons, which, of course, is a greater amount than has ever been put into a lake steamer. It would exceed by practically 2,000 tons any cargo of ore brought from the head of the lakes to Lake Erie ports. The steamer William Edenborn last year carried 8,807 gross tons of ore from Escanaba to South Chicago, but she was favored all the way with something over 20 ft. draught. These figures for the Wolvin are all based upon 18 ft. draught. Nothing could more greatly typify the wonderful growth of lake commerce than the capacity of this great steamer. Her initial cargo of ore will be practically ten times the movement of ore during the full season of 1855, when the Sault Ste. Marie canal was first opened to commerce. Three single trips of the Wolvin would have carried the entire ore commerce of the great lakes for a number of years thereafter.

While the lone navigation of the Atlantic seems a very foolish affair one can't help admiring the courage of those who undertake it. Capt. Ludwig Eisenbaum, who completed the navigation of the Atlantic from Boston to Marseilles in a 17-ft. Swampscott dory, has returned to this country. His trip across was almost a constant struggle for life. Several times he narrowly escaped drowning. Upon one occasion his boat capsized and nearly all of his provisions spilled, including four casks of water, but he succeeded eventfully in righting the dory and proceeding. He was found in this predicament by the steamship Greenbrier, the captain of which, suspecting something wrong, invited him on board and urged him to abandon the perilous undertaking. Eisenbaum, however, being supplied with bread and longitude and latitude declared that he would complete the trip alone—and complete it he did. These trips are probably useful in proving that perseverance will accomplish anything.

The Merchant Marine Commission appointed by congress to inquire into the state of American shipping concluded its North Atlantic coast hearings in Boston last week and is now taking a temporary rest. The next sessions of the commission will be held on the great lakes, beginning in Chicago on Friday, June 24, immediately after the adjournment of the Republican national convention. Two days will probably be spent in Chicago and the commission will then visit Detroit, Cleveland and Buffalo, consuming probably another week in hearings. It is likely that the hearings on the great lakes will have far more effect in influencing remedial legislation than the coast meetings. The cities of the great lakes are part of the great manufacturing belt of the United States and are contiguous to the great agricultural regions of the country. It is the farmers and manufacturers of the great west that are most closely concerned with this question of shipping. They realize very keenly how important it is that the avenues of transportation should be kept open at all times. It would be uncivil irony to say that the avenues of transportation on the high seas are now kept open for the uninterrupted movement of American products. They are not. It is impossible for an American manufacturer to ship his product to the South American market without making it subject to delays from hostile hands. Articles intended for South American exports must first be dumped on Liverpool docks and if they come in competition with similar products of the English manufacturer they do not receive the dispatch that properly belong to them. So very small a percentage of American exports go abroad in American ships that any international conflict involving the ships of other nations must inevitably paralyze our export trade. This condition of affairs is appreciated far more in the inland states than it is in the coast states, and undoubtedly these points will be very thoroughly expounded to the commission.

Manufacturers, business men and chambers of commerce are taking a very lively interest in the

forthcoming visit of the commission to the great lakes and undoubtedly the commission will both meet and hear the representative men of the states bordering on the great lakes. The information which will be supplied to them will be of an invaluable character; and moreover they will have the visual evidence of what protection has done when it is extended to shipping. The finest fleet of vessels in the world is flying the American flag on the great lakes; but nowhere else is this flag displayed. The benificent influence of the coastwise laws has done this for shipping on the great lakes. A reasonable amount of aid will do it for American shipping on the high seas.

That not a single ship should have been ordered for more than two years past for the foreign trade of the United States is a pretty bitter commentary to make. It is the tangible outcome of the present unequal warfare which American shipping is making in the foreign trade. Four years ago contracts were given to Atlantic coast ship yards for seven great ships for the foreign trade of the United States. Three of these contracts were let by Mr. Alfred Winsor of the Boston Steamship Co. and four of them were given by the Atlantic Transport Co. In addition the Great Northern Steamship Co. undertook the construction of two great liners at its ship yard at New London, Conn. When this group of contracts was let it was more than a hope, in fact it was almost a promise, that aid would be given by the federal government to stimulate shipping in American bottoms. Every one knows that aid was not forthcoming, and Mr. Winsor has now declared that he is through with the attempt to maintain the American flag on the ocean's highways. The Atlantic Transport Co. disposed of two of these four ships, the Mongolia and the Manchuria, to the Pacific Mail Steamship Co., and Mr. J. J. Hill of the Great Northern railway says that he would rather build a thousand miles of railroad rather than attempt to build two more ships like those constructed at New London. This is the direct and tangible outcome of discrimination against shipping by congress. If aid could only be given in some form, even if only for a few years, it would aid greatly to restore the American ship to the high seas. What is needed is aid to overcome the present handicap and to establish American trade routes independent of the routes already established by other nations. Herein lies the great mission of the Merchant Marine Commission.

SITUATION BETWEEN MASTERS AND OWNERS

There are complications and complications in the lake situation but the net result is that the vessels are gradually going into commission. During the week there have been a number of withdrawals of masters from the Masters and Pilots' association. In addition a number of the leading owners have been notified by their masters that whenever their services were needed they could be secured. As a result a great many vessels are being fitted out. Owners are moving very conservatively and are not hastening matters at all, but they represent that they are quite confident of their ability both to place and to keep their boats in operation. The relation of a number of owners and masters is very intimate, and no ill feeling is harbored on either side. It is the opinion of the leading owners that the present controversy has been projected against the sober sense of the majority of masters and they are therefore inclined to be lenient.

During the early part of the week the indications were that the entire lake fleet might be in operation at the end of the week if circumstances warranted. A further complication has now crept into the situation which is not however regarded by the owners as especially serious. The present movement is an attempt to affiliate the Masters & Pilots' association with the American Federation of Labor. There have been some intimations of this for the past few days, but the actual nature of the affair was not made known until Tuesday of this week when Capt. J. M. McGregor issued a statement to the effect that the affiliation was to be secured with the American Federation of Labor through the International Pilots' association. It is therefore to be presumed that the Masters & Pilots' association becomes a part of the International Pilots' association. To intelligently understand this latest phase of the situation it will be necessary to go back a couple of years. Capt. J. M. McGregor of Detroit, who has occupied an occasional position as mate on lake ships, undertook to form the International Pilots' association. The attempt was not well received and the general impression was that it had ended a failure. It was believed that not more than twenty members were ever secured and it was the general impression that the International Pilots' association had elapsed into a state of innocuous desuetude. At any rate no more was heard of it. Last week McGregor came to Cleveland from Detroit and calling upon Mr. Coulby applied for position as mate upon one of the steamers of the Pittsburg Steamship Co. Mr. Coulby was willing to employ him. Mr. McGregor informed Mr. Coulby that he was a member of the American Federation of Labor to which Mr. Coulby rejoined that that made absolutely no difference whatever. McGregor then declared it to be the dream of his life for thirty years past to have the emblem of the American Federation of Labor flying from the mast of every ship on the great lakes and hoped that it might be brought about through the International Pilots' association, of which he represented himself to be the president. He also manifested reluctance towards sailing on a steamer whose master was not a member of the pilots' association and again referred to the great ambition which had been with him for thirty years.

McGregor represented that the International Pilots' association had once 900 members but he was really unable to show whether it had any members in good standing except himself now. In that event it would be doubtful whether the charter from the American Federation of Labor, if existing, would be valid. If valid, vessel owners look upon it as a skeleton for which McGregor is trying to obtain flesh and blood from the Masters & Pilots' association. President Livingstone does not believe McGregor's statement is to be seriously regarded. A number of the unions with which agreements have been made for the season are affiliated with the American Federation of Labor, but the federation is a very conservative body and do not sanction sympathetic strikes. In point of fact the leaders of the other unions emphatically declare that they will see that their contracts are lived up to. Moreover, it is extremely unlikely that the majority of the members of the Masters & Pilots' association would care to be absorbed by McGregor's International Pilots' association. Vessel owners represent that they are gradually preparing for the season's business. New boats are leaving port every day and a number of vessels have been chartered for ore for the first trip.

VESSEL OWNERS STATE THEIR CASE.

The Lake Carriers' association has issued in pamphlet form the brief which it recently submitted to the Cleveland Civic Federation concerning the late controversy with the Masters & Pilots' association. In it the Lake Carriers' association gives its reasons for its unwillingness to negotiate with the Masters & Pilots' association or to submit the matter to any arbitration other than to the established and specially authorized tribunals in control of the service. The lake carriers maintain that the masters occupy a unique position to the government, to the owner and to the public. Congress through its acts clearly regards the merchant marine, owners and licensed officers alike, as a quasi-public service. In connection with the system of examination and licenses and for the protection of life and property afloat, it is made unlawful to employ any person as master or watch officer who is not licensed by the government inspector. The master by virtue of his occupation is exempted from various obligations that devolve upon other citizens, as for instance, draft in time of war. The supreme court of the United States defining the masters' power says: "The master of a ship is the person who is entrusted with the care and management of it, and the great trust reposed in him by the owners, and the great authority by which the law has invested in him, require on his part, and for his own sake no less than for the interest of his employers, the utmost fidelity and attention."

Mr. Justice Story of the supreme court held:

"The master of the ship is the confidential servant or agent of the owners, and they are bound to the performance of all lawful contracts made by him, relative to the usual employment of the ship, and the repairs and other necessaries furnished for her use. This rule is established as well upon the implied assent of the owners, as with a view to the convenience of the commercial world."

The Lake Carriers' association admits that it has endeavored to deal with the Masters & Pilots' association, but as a result of its experience has reached the conclusion that it is impossible and contrary to all the necessities to deal with masters through an organization in which they are associated with their subordinates who outnumber and can outvote them, and who are oath-bound to rules and regulations inconsistent to rules prescribed by the government and antagonistic to the full and fair performance of their duties to their ship, the owner and the public.

The Lake Carriers' association neither owns nor operates vessels. It was originally formed for the purpose of securing united action on the part of vessel owners for the improvement of channels and the establishment of aids to navigation. However, as the various divisions of the trade were forming themselves into unions, the committees of the Lake Carriers' association were given authority to deal on behalf of its members with committees of the labor organizations with the general purpose of securing prompt and uniform results from all classes of labor. The first contract of the Lake Carriers with the Masters & Pilots' association was during the meeting of the Lake Carriers in Detroit in January, 1903, when district Captain Maytham asked for a meeting on behalf of his organization and presented various propositions involving dealing through his organization with the masters and mates. This at the time was regarded, it is stated by the Lake Carriers' committee, as involving the very grave considerations arising from the relations of the masters, and by mutual arrangement further conference was deferred. Shortly before March 26, 1903, Capt. Maytham, pursuant to this arrangement, came for a conference. He was asked to assemble a representative committee of the masters, which he said he would gladly do, and the conference was postponed for three days accordingly. During this interim, Capt. Maytham issued a strike order to the captains and mates then on their boats to quit work. When his delegation appeared the Lake Carriers' committee declined to negotiate by reason of the strike order. The next day the committee came back accompanied by Capt. John C. Silva of Boston, grand captain of the Masters & Pilots' association, who declared the strike order to be improvidently issued and rescinded it.

The brief then touches upon the trouble which marked the season of 1903, mentioning the steamer State of Ohio, when the mates made a demand for an increase in wages a few minutes before the vessel's leaving hour and quit, compelling the steamer to remain at dock all night. The cases of the steamers John N. Glidden and D. M. Clemson are also touched upon.

This brings the situation up to the season of 1904. The Lake Carriers' association, through its executive committee, had no trouble in making season working arrangements with the Marine Engineers, Firemen, Oilers & Water Tenders, the Seamen's union, the Marine Cooks' association and the Grain Shovelers' association. Having settled these amicably, negotiations were taken up with the Masters & Pilots' association. Capt. Maytham and his advisory council appeared before the executive committee of the Lake Carriers' association and submitted their demands. Among the demands was the following:

"The master shall be entitled to a full season's salary unless he is discharged for cause, which will be investigated by a committee to be selected from the owners and agents and the directors of the advisory board."

Further along the demand contained the following clause:

"The masters shall have the right to employ their mates and pilots on all steamers."

Of course, the executive committee of the Lake Carriers' association immediately endeavored to get at the bottom of the clause that the masters should be entitled to a full season's salary unless discharged for cause, and discovered that the association was endeavoring to make it impossible for an owner to remove a master without first submitting the matter to arbitration. The executive committee maintained that the master was entrusted with the care and management of the ship, in which position the law gave him great authority; that he was the only person aboard that the owner had to look to and that the owner could not be expected to entrust his property to some one over whom he could exercise no control. This point was stubbornly defended by the Masters & Pilots' association for some time, but was finally waived.

According to the owners, however, one of the most unreasonable acts of the Masters & Pilots' association, was the issuance of a circular letter under date of April 15 to the effect that all masters who laid up a steamer in 1903, unless they were notified before Jan. 15, 1904, that their services were no longer needed, should, if the steamer was operated in 1904, be reappointed as its master or be given a better steamer. This measure was, of course, retroactive and had no semblance of justice in it. The committee finally got down to a discussion of the wage schedule. The scale presented by the masters was higher than that which obtained last year, but it was pointed out to them that a reduction was to be expected rather than an increase. The masters were very much opposed to a reduction and as a counter-proposition it was suggested that the men be paid last season's Lake Carriers' rate of wages. The advisory council with which the executive committee of the Lake Carriers' association was doing business took this under consideration and finally stated that they would recommend its acceptance. This was the first indication that the executive committee had that the advisory council and the Masters & Pilots' association was not empowered to act. The scale when submitted to a referendum vote of the harbors was rejected. As a rule when a committee of men unanimously agree to a proposition employers have come to regard the matter as settled, and according Mr. Harry Coulby, president and general manager of the Pittsburg Steamship Co., ordered his masters

to report to him. He was very much surprised to have this order countermanded by District Captain Howell and to be informed that the Masters & Pilots' association had returned to their original proposition. Of course, the original proposition was one that the majority of masters knew very well could not possibly be accepted by the owners.

The brief also recites certain other grievances which the Lake Carriers' association maintained could not possibly be submitted to arbitration.

GROWTH OF CANADIAN LAKE MARINE.

An examination of the registry of the vessels engaged in the freight or freight and passenger trade of Canada reveals that there are very few modern vessels of large capacity engaged in the trade. On the Atlantic coast, with the exception of the coal carrying trade from Sydney and Parrsboro, Nova Scotia, the trading is done in locally built schooners, or small coasting steamers of less than 200 tons register. In regard to the trade from Parrsboro, the coal is carried mainly in tow barges having a capacity of about 2,000 tons dead-weight, while from Sydney it is carried in chartered steamers, some of which are owned by the Dominion Coal Co., and the others are chartered steamers. All these vessels, however, have been built in Great Britain and the smaller ones only are owned in Canada, the remainder being mostly owned in Norway. There are a number of fairly large steamers engaged in the coasting trade, freight and passenger, between Montreal and Quebec and maritime province ports, but they also are British built, though Canadian owned. The British type of vessel predominates on the Atlantic coast, as it does on the Pacific, so far as freighting is concerned. The only exceptions on the western coast is in the vessels engaged on the river trade, where flat bottom and stern-wheeled steamers are used. This type of steamer is susceptible of but little improvement in its general design, consequently it is not necessary to say anything about it. Of the vessels engaged on the minor internal waters there are but few vessels of any size, the most noticeable being those found on Lake Winnipeg, the Lake of the Woods, Lake Temeskaining and Muskoka Lake. Those on the latter lake are almost entirely for the passenger trade, and of those on the other lakes the Keenora, on the Lake of the Woods, and the Meteor, on Lake Temeskaining, both of which were built since 1897.

Coming to the Great Lakes and the St. Lawrence river system of fresh water navigation a disinterested and unprejudiced observer would be inclined to state that the Canadian merchant marine there was little more than a myth. There are but few modern steamers in the service, and of these the majority are British built, and only a few of the British built steamers having been specially built for the trade. Of the Canadian built vessels engaged in freighting on the Great Lakes there are only a few that can be said to be of recent construction and equipment. The reason for this is not hard to see, because there was no necessity in Canada for large freighters until within the last few years, and even today, the quantity of cargo freight, as distinguished from package freight, is limited. The cargo freight is entirely eastbound, and consists of grain from Lake Superior to Georgian Bay points, or Kingston, for transhipment to Montreal, and iron ore from Michipicoten to Sarnia for transhipment to Hamilton. The total of this trade will not run to much over 1,000,000 tons in a year. This trade has been a growing one, because twenty years ago there was no surplus produce in the northwest for export, and the Helen mine was unknown seven years ago. Twenty years ago the Canadian Pacific railway placed on the upper lakes, the steamers Alberta, Athabasca and Algoma, built in Great Britain, and of about 1,550 tons register each. Of these the Algoma was lost, but was replaced by the Manitoba, 1,699 tons register, built at Dover Sound, by the Polson Iron Works of Toronto in 1889. These steamers are constructed for the freight and passenger trade, and type of steamer, judging from the number built since for trading between Canadian ports, has been the most profitable during the period of growth. A glance over the registry of vessels published by the marine department, and of the list of vessels brought on to the Great Lakes within the last three or four years, but which are registered elsewhere, shows that there are about sixty-five steamers of over 300 tons register engaged in cargo freight trade, or the freight and passenger trade. Of these thirty-five were built in Canada, eight in the United States, and twenty-two in Great Britain. Of those built in Great Britain eighteen were built to suit the trade, and four were purchased as being suitable for the trade. Coming to the age of these vessels, there are two built in 1867 and 1868 respectively, six built between 1870 and 1879, seven built between 1880 and 1889, twenty-two between 1890 and 1899, and seventeen between 1900 and 1903, inclusive. Of those built between 1890-99 four were only placed on the upper lakes in 1902.

So far as the type of vessel is concerned there are two classes, one of which is intended for trade on the upper lakes only, and the other of Welland canal size. Looking at the small number of vessels engaged in the trade it will be sufficient to say that we are only at the beginning of the development of the freight vessel for navigation on the Canadian inland waters. Following is a list of the vessels added to the different lines from 1900 to the end of 1903, with names of owners, etc., as gathered from official and other sources:

1900—Ottawa, built for J. R. Booth, Ottawa, at Toronto; length, 256 ft.; beam, 43.2 ft.; depth, 15.2 ft.; gross tonnage, 2.431; net tonnage, 1,344.

Donnalona and Strathcona, built for the Hamilton and Fort William Navigation Co. in Great Britain; 1,222 tons and 1,465 tons register, respectively.

1901—Midland Queen, 1,348 tons register, built in Scotland for the Midland Navigation Co., Midland, Ont.

1902—Turret Court, 1,197 tons register; Turret Crown, 1,190 tons register; Turret Chief, 1,197 tons register; Turret Cape, 1,142 tons register. These steamers were built at Sunderland, England, in 1895-96, and are of the turret type. They were run between Sydney and Montreal by the Dominion Coal Co., when W. Petersen of Newcastle-on-Tyne, England, the owner, purchased the Canadian Lake and Ocean Navigation Co., Toronto, and transferred the steamers to the Upper Lakes under its management. The company subsequently had built in England and Scotland three additional steamers specially designed for passing through the Welland canal. These steamers are of about 2,000 tons register and are: J. H. Plummer, H. M. Pellatt and A. E. Ames.

Simla, built at Garden Island, Ont., for the Calvin Co., 973 tons register.

Huronic, built at Collingwood, Ont., for the Northwest Transportation Co. (Northern Navigation Co.); 3,530 tons register.

Tadenac, built at Toronto for the St. Lawrence and Chicago Steam Navigation Co., Toronto; 3,150 tons register.

Fairmount, built in Great Britain, for the Montreal Transportation Co.; 1,183 tons register.

1903—Midland King, 4,900 tons gross, built at Collingwood, Ont., for the Midland Navigation Co., Midland, Ont.

W. D. Matthews, 3,959 tons register, built at Collingwood, Ont., for the St. Lawrence and Chicago Steam Navigation Co., Toronto.

Westmount, 1,171 tons register, built in Great Britain for the Montreal Transportation Co.

Neeburg, 3,000 tons dead-weight capacity, built in Great Britain for the Neeburg Navigation Co., Port Arthur, Ont.

Wacondah, 996 tons register, and Neepawah, 990 tons regis-

ter, built in Great Britain for the New Ontario Steamship Co., Hamilton, Ont.

Tadonsac, 2,500 tons register, built at Toronto, for A. Wright, Toronto Victoria Harbor Lumber Co.).

Fremount, 3,400 tons gross, built in Great Britain for the Farrar Transportation Co., Collingwood, Ont.

Wexford, 3,500 tons gross, built in Great Britain about 1890 and bought by a Collingwood company.

No mention is made of the Algona Central Railway Co.'s fleet, which consists of two freight and passenger steamers purchased in the United States, but registered at Sault Ste. Marie, Ont., and the owner at St. Johns, N. F.; a number of freight carriers registered at United States ports, where they were purchased, and a 6,000 gross ton barge, the Agawa, built at Collingwood in 1902.

Of the freight carrying steamers built in Canada, the Bertram Engine Works Co., Toronto, have built those of canal size, while the others were built by the Collingwood Shipbuilding Co., Collingwood, Ont. The former company have now under construction a grain and package freight carrier capable of carying 70,000 bu. of grain through the canals. Her dimensions are: Length over all, 256 ft.; breadth, 42 ft.; depth, 18 ft.; and she will be fitted with one triple expansion engine, cylinders 15 in., 25 in. and 42 in. by 30 in. stroke, to which steam will be supplied by two return tubular Scotch boilers, 10 ft. diameter, by 11 ft. long, at a pressure of 180 lbs. It is expected to develop a speed of 12 miles light, and 10½ miles loaded. Accommodation is also being provided with all modern conveniences for the package freight trade including six 3-ton deck cranes. So far as the Polson Iron Works, Toronto, is concerned it has been lately engaged in the construction of dredges, lightships and other vessels for the Dominion government, and yachts, etc., for private owners. With the entrance into the construction field of the Canadian Shipbuilding Co., which will probably be this season, it is believed that there will be some extensive developments in the way of shipbuilding.

SITUATION IN THE ORE TRADE.

The total movement of ore by Lake Superior last year was 23,649,550 tons, of which amount 4,521,576 tons had been moved up to June 1, leaving a balance for the rest of the season of 1903 of 19,127,974 tons. So far this year there has been practically no movement of ore whatever, and there probably will not be any to speak of during the present week. It will be practically the middle of June before the ore movement will really be begun. During June of last year 3,715,353 tons of ore were moved, so that it is fair to assume a movement of 1,800,000 tons for the first half of the month, which would leave a balance of 17,327,974 tons for the rest of the year. If, therefore, 17,000,000 tons are moved during the present year, this season will be, from the vessel owner's standpoint, proportionately as good as last.

Ore is moving quite freely forward from the docks, and they will be in somewhat better shape than they were at the opening of navigation last year. Of course, if navigation had opened as early this year as last, the docks would have been very much congested, because there was an enormous quantity of ore on dock May 1, but the month's delay has served to reduce the stock considerably. Owing to the strike of the masters and pilots a great listlessness has been displayed in the ore trade on all sides, and practically no chartering has been done, but vessel owners anticipate that the rate will be the same this year as last, which was 85 cents from the head of the lakes. However, conditions were very peculiar in the ore trade last year, and while the rate of 85 cents was maintained throughout the year, it was artificially so rather than naturally so. However, it is not expected that the rate will be diminished, as the vessels are under heavy operating expenses and the gross earnings, owing to the shortness of the season, will be greatly lessened.

AROUND THE GREAT LAKES.

The city of Lorain has renewed its contract with Braymen Brothers for dredging in the river under the $200,000 appropriation.

The passenger steamer Monarch is stranded in Lake Superior, 12 miles above White Fish Point. She ran out 3 ft. on a sand bottom.

The ship yard of the Chicago Ship Building Co. at South Chicago will be closed in June, as the repair work now on hand can be cleared up quickly.

The Canadian steamer Donnecona, ore laden from Escanaba, ran on White shoal last week. She was released after being lightered by the Favorite.

The bid of W. H. Rabbitt & Sons Co. of Toledo for the construction of the new St. Clair flats ship canal has been approved by Col. Davis and forwarded to the war department for final action.

The steamer Henry Steinbrenner, bound up with coal, went ashore at Bar Point this week. She was released after unloading 500 tons on the lighter Hammond, and proceeded on her journey.

J. W. Wells of Menominee, Mich., has ordered a large naphtha launch from Conley of Green Bay, Wis. The launch will be 50 ft. in length and will be driven by a 20 H. P. naphtha engine.

Louis Pfohl & Son of Buffalo have purchased the wreck of the steamer J. Emory Owen, destroyed by fire in Green Bay last fall, and that of the car ferry Shenango, burned off Conneaut last winter.

The sea tug Niagara, one of the largest boats of her class on the lakes, and owned by the Perry Towing Co., of Sault Ste. Marie, went on the rocks at Knife island on June 4. She is a total loss. No lives were lost.

The new steamer Wisconsin, on her maiden trip grounded on a sand bar about 3 miles above Vermilion Point. She was liberated and sustained no damage. The Wisconsin and her cargo represent about $550,000.

The machinery of the fuel scow Agnes, belonging to the Baltimore & Ohio railroad, which was lost overboard at Erie, Pa., when the scow was drifting the lake, will be raised by the Standard Construction Co. of Cleveland.

The passenger steamer City of Buffalo, belonging to the Cleveland & Buffalo line, which was lengthened 42 ft. during the winter, will be open for inspection by the Cleveland public at the company's dock Friday afternoon of this week.

Col. Frank J. Hecker of Detroit has sold his steam yacht Vita, to E. Leyden Ford, secretary and treasurer of the Michigan Alkali Co. The Vita is 115 ft. over all, 100 ft. on deck, 89 ft. 4 in. on the water line, 18 ft. 4 in. beam and 6 ft. 4 in. deep.

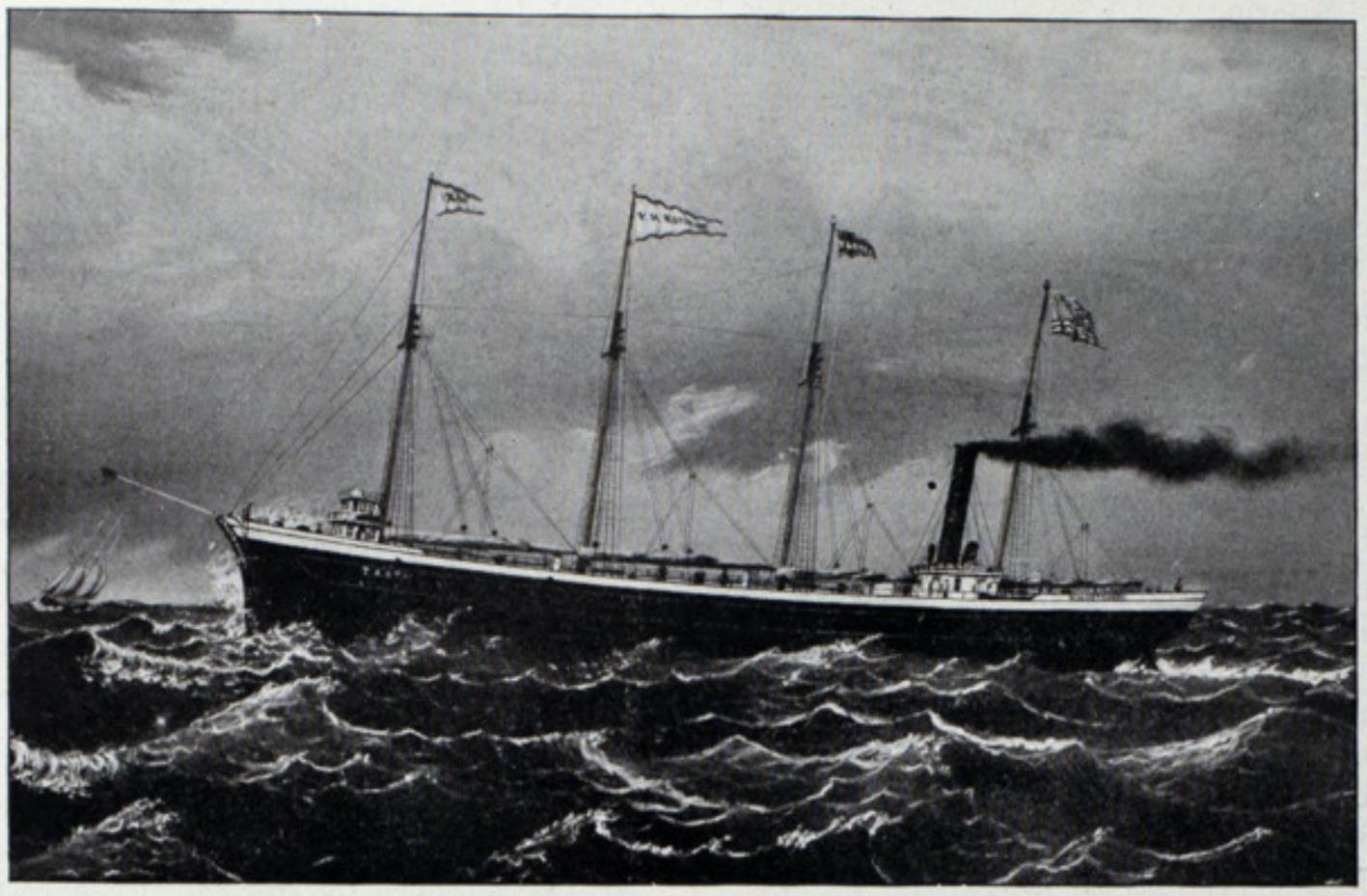
The turning basin at the plant of the National Tube Co. at Lorain is only 538 ft. across, so that it is impossible for the great steamer Augustus B. Wolvin, which is 560 ft. long, to turn here. The company is now negotiating with the city of Lorain to the end that the basin may be widened.

A new chart in colors has just been issued by the corps of engineers, United States army, of the east end of Lake Superior from Cape Gargantua, Ont., to the mouth of the big Two Hearted River, Mich., including White Fish bay and the head of St. Mary's river. It is for sale by the Marine Review.

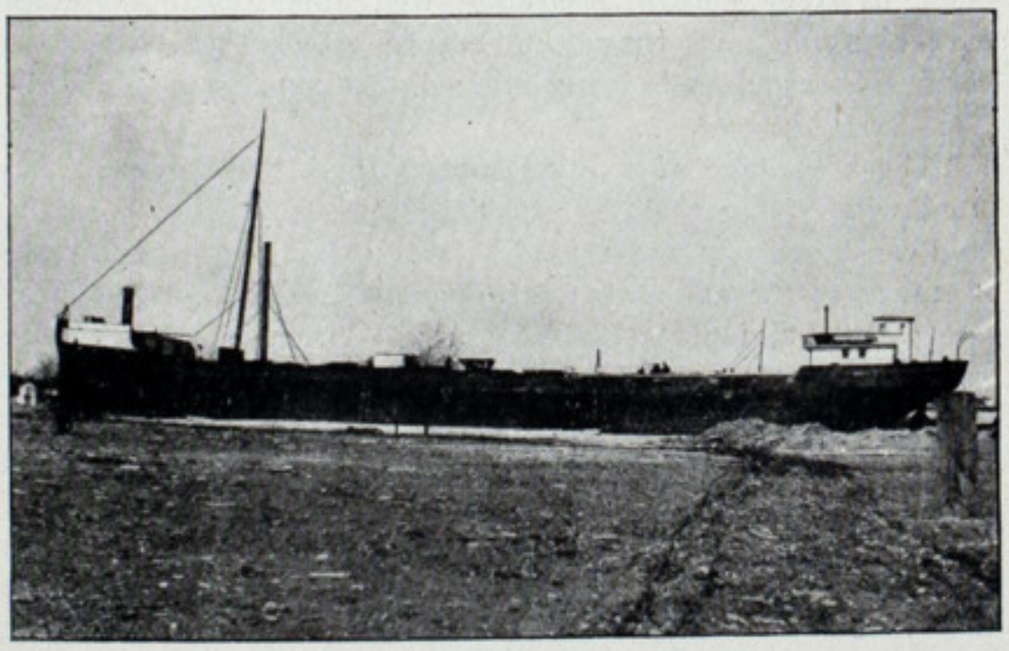
The Great Lakes Towing Co. has filed a libel against Worthington & Sill, marine insurance agents, for $15,641.38, for work done in releasing the steamer John Craig on Simmon's reef, Lake Michigan, last year. The company's bill was $22,405.65, of which amount it claims to have received only $6,764.27.

HISTORY OF THE V. H. KETCHAM.

The steamer V. H. Ketcham was at the time she was built the largest cargo carrier on the lakes. She was 223 ft. keel, 41 ft. beam and 16 ft. deep. When she was launched at the yard of David Lester, Marine City, Mich., in 1874, people came from all over the state to see what they called the "floating island" slide into the water. The Ketcham was equipped with four spars, all carrying sails, and also staysail. Owing to the conditions of the docks and the poor facilities for handling the cargo of this "floating island" at both ends of the route she was far from being a profitable investment and sold after being run three seasons for $65,000. Meanwhile, however, the facilities for handling her cargo on the docks were becoming better and better and she finally became so profitable a carrier that she has the reputation of laying the foundation of several fortunes. When she first came out there were no facilities whatever for loading coal, it being wheeled aboard in barrows, a very tedious operation. Wood was principally used for fuel on her trips, only 50 tons of coal being consumed from Chicago to Buffalo. She carried about 36 lbs. of steam. The Ketcham was built for the Toledo & Saginaw Transportation Co. and of the original stockholders all have passed away except M. Morris of Toledo, Capt. Thomas Lester of Marine City, W. S. Brainard of Toledo and A. Gebhart of Dayton, who was the president of the company. The Ketcham was sold in 1878 to Adam & Delemeter of Cleveland, and later to Mr. Frank Seither of Cleveland.



THE V. H. KETCHAM AS SHE LOOKED WHEN LAUNCHED IN 1874.



THE V. H. KETCHAM REMODELED INTO A SCHOONER.

[Rebuilt by Abram Smith & Son, Algonac, Mich.

Many changes have been made in the Ketcham since she was launched, but the greatest of them all was made last winter when her owners sent her to the yard of Abram Smith & Son, Algonac, Mich., and not only had her converted into a schooner but caused her to be rebuilt from the light water mark up. As a schooner she has three additional hatches, steam steerers and every equipment to make her a modern consort. Her machinery was installed in the steel steamer R. W. England, recently launched from the yard of the Great Lakes Engineering Works, Detroit, Mich.

EDITHIA.

The Edithia, the largest and most powerful gasoline yacht in the world, designed by Gardner & Cox of No. 1 Broadway, New York, for John H. Hanan of the New York and Larchmont yacht clubs, was launched last week at the yards of Samuel Ayres & Sons, at Upper Nyack, N. Y., and was christened by Mrs. Hanan, after whom it is named. The motive power is supplied by two 300-H. P. Standard gasoline engines, each having six cylinders 12 by 14 in. and driving twin screws. The gasoline tank has a capacity of 2,200 gallons. A sustained speed of 21 miles an hour is guaranteed. Mr. Hanan will use the yacht for cruising between New York and Narragansett Pier.

The Edithia is 114 ft. 9 in. over all, 103 ft. 6 in. on the water line, 15 ft. 10 in. beam and 5 ft. draught. On the upper deck forward is a dining saloon and pantry, the latter connecting by a lift with the gallery below. On the lower deck forward are the quarters of the officers and crew, amidships is the engine room, and aft the owner's quarters. The main saloon has two berths and a single stateroom, three lavatories, and a bathroom opens from it. These rooms are furnished in white mahogany, with electric lighting throughout.

RESUMPTION OF OPERATIONS AT THE SAULT.

Sault Ste. Marie, Mich., June 8.—Preparations are under way for a resumption of mining operations at the Helen mine, of the Lake Superior Co. at Michipicoten, Lake Superior. It is said that the mine will probably not ship much more than it has sold to Cleveland agents and for American consumption. If so it is probable that what ore may be required for the Lake Superior Co.'s furnaces at the Sault will be secured elsewhere. The company is also preparing to reopen its nickel and pyrotite mines at Sudbury and has already sent men there. Such are the details connected with resumption at this company's various plants and mines, that it will be sometime before any definite statement of what will be done this year can be secured, but it may be said that the company will proceed with considerable caution and conservatism, and that it will be slow in the acquirement of new properties and processes. In addition to the 50,000 tons of bessemer pig to be bought probably at Duluth, Minn., the company is negotiating for a large purchase of coke, and is making ready to resume the construction of its two blast furnaces, which need only the final touches.

The loss of the Tug Niagara may induce the government to establish a light and fog signal at Knife island. Knife island shore is a very dangerous point and it is expected that application will be made to Maj. Lansing H. Beach of Detroit, the lighthouse engineer of this district, to have warning installed on Knife island to prevent further accident to boats.

Merchant Marine Commission.

The Merchant Marine Commission opened its hearing in Boston in the reading room of the Chamber of Commerce, June 1. Senator J. H. Gallinger, of New Hampshire, chairman; Senator Henry Cabot Lodge, of Massachusetts; Senator Stephen R. Mallory, of Florida; Representative Edward S. Minor, of Wisconsin; Representative William E. Humphrey, of Washington, and Secretary Winthrop L. Marvin attended. In welcoming the commissioners to Boston, President Henry M. Whitney, of the Chamber of Commerce, spoke of the importance to the people of Massachusetts of the question of upbuilding the commercial interests. Fifty years ago, he said, Massachusetts had the largest interest of any state in the union in the nation's sea-going trade; so it is of especial importance to the commonwealth to have such measures taken as will promote the upbuilding of the American mercantile marine.

After explaining the purposes and methods of the commission, Chairman Gallinger called on Alfred Winsor, president of the Boston Steamship Co., which operates vessels in foreign trade between Puget Sound, Japan, China and the Philippines, president of the Boston Tow Boat Co. and of the Boston & Philadelphia steamship line, who said that his present position of attempting to run, in regular lines to foreign ports, new American built steamships under the American flag in competition with subsidized foreign ships gave him authority to say that there was no hope of building up or increasing our foreign going merchant marine under present conditions. As methods of relief he suggested first, a system of direct subsidy. Failure of the Frye bill, which met with considerable opposition even from undoubted friends of the American merchant marine, had led him and others interested in the matter to formulate a subsidy bill somewhat different in character, providing for freight steamers and sail vessels, with extra compensation of 25 per cent to encourage regular lines to foreign ports, leaving the present mail subsidy to take care of the fast steamers. The bill was not presented to congress at its last session by reason of the creation of the Merchant Marine Commission, but was taken by the commissioners at the hearing to be placed in the records.

Appreciating that there is a strong opposition both in congress and out to a direct subsidy Mr. Winsor said that he would recommend a mail payment to all steamers sailing in a regular and efficient line to any foreign port from any quarter of the United States, the payment to be based on the mileage and the gross tonnage of the vessels affected. In return the subsidized ships should be obliged to carry the mails under the same conditions attached to the present mail payments, except that the graduated mail payments should start somewhat more moderately. The advantage Mr. Winsor claimed for this method of aid is that steamship lines will be established to all the important or growing ports in South America, Asia, Africa and elsewhere, and undoubtedly the country's commerce will follow its flag. It is such means as these, in Mr. Winsor's opinion, by which England, Germany, Japan and other nations have built up both their trade and their shipping, at the same time creating a market for their products that eventually has made the lines self-sustaining and profitable. In this process the tramp ship has been left to depend largely on the coarse freights bound to less important ports or upon temporary openings wherever the regular lines have not taken care of all the volume of freight offered.

In explanation of the way in which commerce will follow the flag under such a system Mr. Winsor said that it is almost impossible today to find an American firm doing a general mercantile business in any foreign port from the Mediterranean to the Orient, but the citizens of the country under whose ensign shipping sails start commercial houses in ports where the regular lines stop; an American merchant marine that was enabled to compete with the foreign lines would result in the establishment of American merchant firms all over the world. Furthermore, it will be found that in all parts of the world where imports and exports consist to a great extent of manufactured articles the trade is cared for almost exclusively by steamers of regular lines.

FAST SHIPS JUSTIFIABLE ONLY ON THE ATLANTIC.

Mr. Winsor did not think it feasible for the present, either for the carrying of the mails or for increasing commerce, to have extremely fast steamers in any but the North Atlantic European trade. He commented on the fact that even in the most highly developed services the tendency is toward very large steamers with great freight capacity and increased passenger accommodations, of a considerably lower speed than the 21-knot ships employed for carrying perishable goods and express freight. However, in the graded rate of payments there could be an arrangement for increased amounts on increased speed which if sufficient would lead to building and sailing under the American flag vessels that could profitably be used for routes where a quick trip is necessary. For indirect commerce, such as is carried on in tramp ships and sailing vessels, he recommended the method of differential duties, or an expert bounty, or something of that character.

The greater expense of building ships in this country, and of operating them after they are in commission, over the employment of foreign craft was gone into at some length. Mr. Winsor thought that the government should have authority to make contracts, under proper restrictions, for a term of years, with ship owners who propose to avail of the law. He declared that the expense of building and maintaining steamships of large size and high speed was such that no one or two individuals could assume it, and that in order to interest stockholders in corporations which must undertake that work there must be some kind of guarantee that government assistance will continue long enough to assure satisfactory benefits to those whose money is being utilized. In conclusion Mr. Winsor said:

"The advantage of a direct subsidy, or a mail payment, beyond what is suggested by other methods, is that this is simple and can be clearly understood by ship owners and the government, as to the amount of revenue that can be relied upon by the former and the actual cost to the latter. The assistance must be great enough to invite capital to enter into this line of investment, probably greater than some years ago, because as every year goes by there is a smaller nucleus to build upon and capital has shifted into other channels."

Mr. Winsor said that his company was not in receipt of subvention but had to meet strong competition from the Japanese line to Seattle which received a subsidy of $300,000 from the Japanese government and of the so-called Empress line to Vancouver which is subsidized to the extent of $310,000 or $320,000 by the British government. He was not sure that a direct subsidy was the best thing; when Senator Gallinger asked him if a similar compensation to that received by his competitors would help he said that he would not ask for so much. To the chairman's inquiry as to his opinion of free ships as a relief and as to whether he would buy his vessels abroad if permitted to do so Mr. Winsor replied that he certainly would not; after he got them, at the best, it would cost from 50 to 60 per cent more to run them. He said it was not a question of buying foreign ships that was facing some of the owners; if things go on as they are it will become a question of their putting their ships under a foreign flag if only to get cheaper labor. It would do no good to employ foreign sailors,

because they become naturalized and then must have American wages.

In reply to the chairman's question as to whether it would do any good for the government to give a bounty on American-built vessels Mr. Winsor said it would be a good thing for ship builders and if competition was sufficient might help owners. He thought that if the work of the ship yards could be standardized more or less as it is abroad the builders here could come nearer to their foreign competitors, but as it is there is not enough business for American ship builders anyway. Mr. Winsor declared that his lines had lost a lot of money and that without the employment of Chinese labor to some extent in crews it would be impossible to live at all in the face of the competition of his subsidized rivals. He did not believe that in present circumstances any line on the Pacific could be made profitable. The effect of the law to have army and navy supplies for the Philippines carried in American bottoms would be good, but there is not much profit in transporting freight 6,500 miles for a little more than $5 a ton.

CAPITAL WAITING FOR GOVERNMENT ENCOURAGEMENT.

The commission asked the opinion of the representatives of three of the city's largest financial institutions as to the readiness with which capital would go into the upbuilding of the American merchant marine if proper support was assured for it by the government. Francis H. Peabody, of the banking-house of Kidder, Peabody & Co., said that if the government would give suitable encouragement there was plenty of capital in Boston to invest in ship building, but there was no money ready to go into it in the present conditions. James J. Storrow, of Lee, Higginson & Co., bankers, said that there was no prejudice, he believed, against investing in American shipyards or American shipping if there was reason to expect the same returns as would come from other industrial investments. While he was no expert he believed that under the present laws the concensus of opinion in this country would be against such investments because they were not comparable with other openings for the employment of funds. Similarly President Gordon Abbott, of the Old Colony Trust Co., which has taken part in the reorganization of the Fore River Ship & Engine Co. at Quincy, said it would be very difficult to find capital now, but if the laws were changed he thought it would be relatively fully as easy to secure money for shipping and ship building enterprises as for other industrial undertakings.

Daniel S. Emery, who has been a ship owner of Boston for forty-seven years and whose house has in that time owned some 200 vessels, said that now his concern employs but thirty ships, mostly in the coastwise trade, that they are not making money enough to pay the insurance in some cases, and that if some aid is not forthcoming they cannot exist a great while longer. All that enabled them to cling to the coastwise trade was the protection of the navigation laws against competition by foreigners. Mr. Emery complained bitterly of the hardships imposed by the laws regarding the manning of American vessels. As they exist they afford no protection in shipping crews and devised ostensibly to protect the seamen, they have been carried so far as to be detrimental to the owner. Sailors were never better treated or fed; by too much legislation discipline aboard American ships has been ruined, while a man who goes into a vessel flying the stars and stripes as an officer takes his life in his hands. The sailor can hold the ship for anything and everything but the ship cannot even hold the sailors to a contract. The present laws make the maintenance of American merchantmen more expensive than the maintenance of a ship in our navy or the British navy. He would repeal all the present shipping laws and make an entirely new set, somewhat on the lines adopted by England. Free ships would not solve the problem at all, but would be certain to ruin every shipyard in the country.

Secretary Albert Clarke, of the Home Market Club, said that while that organization was composed chiefly of manufacturers and was interested in shipping only indirectly it recognized that the merchant marine is practically the only industry in the country not protected and was on record as not opposing its protection. He gave at some length the answers called forth by a canvas, about a year ago, to determine the opinions of prominent men all over the country, of varying political beliefs and engaged in many pursuits, regarding the best way to rehabilitate our commerce by sea. Asked for an expression of his own opinion, Col. Clarke said, "I favor any method upon which congress can agree to build up our foreign trade. Direct subsidies for regular lines would be the speediest; discriminating duties for the irregular trade."

NECESSARY TO CREATE CONFIDENCE.

R. R. Freeman is owner and manager of a fleet of sailing vessels, only one of which is in the foreign trade, the others having coastwise employment. "Until congress assures a proper return on capital, investors will not seek foreign trade," he declared. "The need is to create confidence on the part of the investing public." For the benefit of the coastwise trade he thought the navigation laws should be amended so that a crew once signed could not leave a ship in total disregard of its contract unless she was proved unseaworthy. He cited a number of cases from his own experience in one of which it had been necessary to secure three crews for taking one vessel from Bath, Me., to Key West. He suggested imprisonment as a proper punishment for such violations of contract as he referred to and said that both parties—the owners and the seamen—should be free or both bound. Detailing instances in which he had been obliged to pay $35 for work that would ordinarily command about $7 because a crew signed for a round trip had left the ship at her port of delivery, he attributed the differences in wages to the organization of the sailors and of boarding-house keepers. Some of the difference in the wages asked at various ports was due to such peculiarities as the desire of sailors to travel in a given direction at certain seasons of the year; for example, they will sign to come north from southern points more cheaply as summer approaches.

The last speaker at the morning session was E. F. Atkins, who described himself as importer and exporter of merchandise, that being "sufficient for the purposes of this hearing." Many years ago, Mr. Atkins said, his commercial house owned its ships; as they wore out they were given up one after another, however, and now all their merchandise is carried, as it has been for many years, in foreign bottoms, because it is possible to charter these so much more cheaply than ships can be owned. Mr. Atkins' remarks amounted to a violent attack on the tariff, which he prefaced with the statement that he was a good republican and expected to vote the republican ticket next November. He said that before the merchant marine could be re-established it would be necessary to go to the bottom and do away with the duty on steel plates. Senator Lodge undertook the same reply to this point that the commission has made elsewhere—that is, that steel plates imported for the construction of ships in American ship yards come in duty free. Mr. Atkins made the point, however, that while this was perfectly true such material could be used only for building vessels to be employed in the foreign trade and that these vessels were specifically shut out from the coastwise traffic by the law. That he considered a serious matter in view of the fact that within a couple of years the Philippines are likely to be regarded as coastwise, and that traders with South American and West Indian ports must miss a good share of legitimate business if they could not stop at intermediate American points.

NO EXCUSE FOR TAXING SHIP BUILDING MATERIALS.

That there was any excuse for taxing ship building materials Mr. Atkins did not believe. He declared that the steel schedules of the tariff oblige an American to pay $39 a ton in this country for identically the same plates that he can buy for $27

a ton in Liverpool. Furthermore, anybody purchasing plates from the United States Steel Corporation to sell in foreign countries will receive a rebate of $5 a ton upon presentation of a certificate of delivery on the other side.

"When the steel duties were imposed years ago they were necessary," said Mr. Atkins. "I believed in them then. But today the only excuse for the exorbitant tariff on steel and steel imports is that it enables certain corporations in this country to pay large dividends on watered capitalization."

Mr. Atkins did not pretend to say why, when the difference in cost of steel amounted to only 5 per cent, the total difference in the cost of building a ship here and in England was 65 per cent. That, he said, the commission was more competent to do than he; but he believed that he had pointed out one factor in the problem and that it was time that the national government paid some attention to it. He agreed that the high cost of American labor as well as the high cost of material entered into the matter and declared that American labor was altogether too high.

"Then you would decrease the wages of the workmen in American ship yards?" Senator Gallinger asked.

"Where American labor is unreasonably high I certainly would decrease wages, but I would not ask the government to do it for me," was Mr. Atkins' reply. "When labor gets too high things come to a standstill and the natural law of supply and demand begins to work. In some branches labor is already being paid excessively. Take the wages of so-called American seamen; a Norwegian sailor ships under the American flag and gets $30 a month, while the same man shipping under his own flag gets only $13 a month."

"Would you apply the same reasoning to the mechanics in our ship yards?" Senator Gallinger persisted.

"If their wages were unreasonable and not sustained by natural laws, I would."

"Do you think they make any bigger profit than you do in your sugar plantations?" the chairman demanded.

"In proportion to the capital invested, yes," was the imperturbable reply.

While he did not think that the tariff on steel plates was the only difficulty to be overcome in solving the problem before the commission, Mr. Atkins believed that its abolition would do more than any other one thing and that most of the other troubles would take care of themselves.

Henry W. Peabody, who all his life has been and still is in a general commercial business here, opened the afternoon session. He said that for forty years he had chartered vessels for both exporting and importing and that while he had always been desirous that the American merchant marine should be re-created such a thing had not occurred to him as a legislative possibility until his attention was called to it by the republican platform of 1896. He considered discriminating duties a pernicious method to adopt and did not believe it possible to "build up a dead industry by choking the commerce that uses it." He strongly favored the establishment of the subsidy method because he thought that the only proper way to stimulate something the nation hasn't got. The subsidy elements of the Hanna, Payne and Frye bills were on the right lines, he said, and would, he believed, increase American tonnage extensively.

Mr. Peabody disapproved of discriminating duties on the ground that it was not a good plan to charge a penalty for what is not done when we may pay a premium for what may be done. To begin discounting duties on imports at the rate of 5 per cent would involve an expense of $40,000,000, or five times the subsidy considered in the Frye bill. Furthermore, to be perfectly fair it would be necessary to impose a 5 per cent tax on articles now on the free list when they came in foreign bottoms, and that would be likely to cause trouble.

"It is a reasonable thing," he maintained, "for the people of the United States as a whole to pay for our disabilities. I should deplore seeing our commerce put on fictitious rates in order to make it support this burden."

At Senator Lodge's suggestion Mr. Peabody said that he preferred the French system, which distinguishes between mail and mercantile subsidies, to the English system of mail subsidies alone. He did not believe that the opening of American registry to foreign built ships, or any free ship measure alone, would accomplish any good.

LINES OF MAIL VESSELS TO SOUTH AMERICA.

Capt. R. G. F. Candage, a former ship owner, spoke strongly in favor of establishing lines of mail vessels, especially to South America. He saw no reason why a letter addressed to Buenos Ayres should have to go to Liverpool first and from there to South America. He favored subsidies because they were direct and not encumbered with other conditions, and because we have before us the satisfactory experience of European nations. If subsidies were impossible, then a differential tariff rate was next best. Subventions for vessels built with special view to their employment for naval uses when needed were also desirable, in his opinion.

In regard to the laws affecting seamen, Capt. Candage repeated that in many ways the present enactments and usage work to the disadvantage of ship owners. If this could be remedied both foreign and coastwise trade would benefit. Much is said about the abuse of sailors, but people suffer from abuse everywhere and no more at sea than on land.

William Rotch of New Bedford, whose family have been in the shipping business for 150 years but have been selling out for the past twenty or thirty years because it did not pay declared in favor of subsidies, although he is not now directly interested in the merchant marine, and expressed his disbelief in admitting foreign ships to the American registry. He considered the greatest trouble in the ship-owners' path to be the cost of maintaining and operating vessels.

Some idea of the condition into which the American merchant marine has fallen was given by Capt. William F. Humphrey, who told the commissioners that on a 15,000-mile trip last year which took him to Russia, Japan, China and the Philippines, he saw but five American flags on shipping and two of those were flown by vessels built abroad. He blamed the whole state of affairs to the protective tariff; that had not only caused high prices in materials, but had raised the cost of everything else, including wages. American locomotives and bridges are going all over the world, he said; the reason is that they are better than anybody else can build and we became adepts in their making because of the necessities of the nation which grew westward from one side of the continent to the other. There is no doubt that a great impetus was given railroad building in the beginning by land grants and other concessions, and it might be that corresponding privileges accorded to the right persons would build up our shipping in like manner. Capt. Humphrey declared himself a Democrat and a free trader, but said that so long as present conditions prevailed he saw no way to help the merchant marine except by subsidy; under protection everything else is subsidized and our ships ought to be.

Capt. Humphrey thought mail subsidies were all right as far as they went but that on account of the differences in cost of operation the size of ships should be taken into account. A mail subsidy should be computed at a rate per ton graded according to speed and the adaptability of a vessel for use in war. He was opposed to a differential tariff but would not oppose free ships, thinking that they would do neither harm nor good. He regarded the Frye bill as the wisest, most practical and efficient measure yet offered.

Answering Representative Minor's questions, Capt. Humphrey said that if subsidies would be graded partly according

to the rate of the ship's speed he thought no better speed test could be devised than that employed by the government, and that while it is possible to force speed for a trial to a point which it is not likely will ever be reached again by the same ship, as a means of classification the plan was perfectly good, one kind of ship being likely to show the same proportionate differences in trial and in everyday practice as another. He told Senator Mallory that he did not like tonnage dues or any kind of discrimination.

William B. Bird, a merchant and manufacturer for sixty-six years, the Hon. Henry Lord of Bangor, Maine, a vessel owner for more than thirty years, and Capt. J. C. Entwistle of Salem, vice president of the Boston Marine Society, also gave the commission their opinions. Mr. Lord made a special plea that the commission should consider the question of giving some help to the small wooden vessels whose day has not yet gone by. He told of the decadence of shipbuilding, ship owning, and ship sailing in the great marine state of the country, but while he felt that reactionary measures were an immediate necessity he had none in particular to suggest. Capt. Entwistle said that the Boston Marine Society was composed of nearly 400 ship masters, most of whom had retired and many of whom had retired because in the decay of American shipping there were no ships left for them to command. He thought subsides "an unpatriotic method of putting a premium on patriotism." He thought that more Americans in the merchant marine service would help build it up and considered the question of maintenance of special importance.

ARGUMENT OF THE SEAMEN'S UNION.

The first day's session closed with an hour and a half discussion by William H. Frazier, general secretary of the International Seamen's Union of America, largely devoted to an argument in support of several changes in the navigation laws which his organization desires to see accomplished. He stated his text as "Why the American boy doesn't go to sea," and made the reason out to be that under present conditions the deck of a merchantman was no fit place for anybody. He particularly attacked the law which provides imprisonment for the penalty of desertion and said that it was the cause of a great deal more trouble than it cured. Furthermore, he declared that no man should be punished penally for violation of a contract to labor. Suits for cruelty should be brought against the ship and not its master, he maintained, the latter having, very frequently, no property attachable and always having every opportunity to escape service. He argued for some uniformity in manning and demanded the prohibition of the employment of Chinese in the crews of American vessels, saying that the sailor "wants the same protection as the laborer ashore." This reopened the Chinese discussion which had come up at the morning session and called forth from Representative Minor a disquisition on the desirability of putting more responsibility on the sailor; not trying to regulate his affairs for him quite so much but allow him to do something for himself once in a while. In the talk which followed it developed that ships which paid Caucasian seamen $35 a month, paid their Chinamen $7 a month, but Mr. Frazier finally yielded, by silence, before the argument that unsubsidised American vessels, if they were not allowed to employ Chinese would have to go out of business altogether rather than to compete with subsidised foreign ships which could employ mongolians.

When cross-questioned by the commissioners regarding the interference of members of his union with non-union sailors, Mr. Frazier said that it had never gone further than trying to persuade men not to ship for less wages than the union was demanding. He admitted that here, as in New York, the union has a launch or yacht for visiting vessels lying in the stream with the purpose of persuading their crews to leave in some circumstances; but he denied that men had ever been taken off ships in this harbor by force. Three members of his organization who were arrested some time ago had been taken in custody, he declared, for trying to dissuade non-union men, whom they met on the street, from going aboard a ship for which they had already signed articles. He told Senator Mallory that he believed the Seamen's union was right in its methods morally as well as legally. On the whole, Mr. Frazier made the best impression on the commission of any of the labor men who have so far appeared before it.

THE SECOND DAY'S SESSION IN BOSTON.

The first witness to come before the commission at the second day's session, which closed the Boston hearings, was Capt. Joseph M. Lewis, who is port captain for the Boston Steamship Co., the Boston & Philadelphia Steamship Co., and the Boston Towboat Co. When Chairman Gallinger asked him why the Boston Steamship Co. employed Chinese sailors on its ships in the Oriental trade, Capt. Lewis said that it was mainly because of never-ending contention with the labor unions of white sailors; these organizations, he declared, are considerably stronger on the Pacific coast than on the Atlantic.

The chairman asking if it would be possible to run an American line of American ships under the American flag and manned solely by Americans in competition with subsidized foreign lines employing Mongolians in crews, the witness said that he was thoroughly convinced from his past experience that it would not be; neither did he think it would be advantageous to American seamen to put the ships in question under foreign flags. He made some reference to the treatment of sailors on American vessels and said that he had never heard of any case of unusual cruelty on shipboard. He had no doubt that the American boy would go to sea as in former years if he had before him the inducements of a reconstructed merchant marine affording opportunities for promotion; in fact, he is doing so now in the coastwise service, which is thoroughly American.

Capt. J. C. Ross, pilot commissioner of Boston, believed that the only way to build up a mercantile marine was by giving subsidies, as in 1840. He reviewed the experience of American and English ship owners in the matter of subsidies and declared that our shipping had done very well so long as the government gave it the same kind of aid which the British government affords its vessels. In his opinion, history showed conclusively that the United States must do just what England does and has done if it wishes to establish its cargo-carriers on the same footing with those of England.

Augustus P. Loring said that besides being president of the Plymouth Cordage Co., and an owner in ships himself, he had invested considerable money in marine ventures for other people for whom he acted as trustee. All these investments were in the American coastwise trade or in British ships in foreign trade; American vessels in the foreign trade were not built cheaply enough in this country and there is not sufficient desire to build ships here anyway. Either some advantage should be afforded the shipyards in the form of drawbacks to enable them to compete with foreign builders, or else American owners should be allowed to buy vessels abroad and after they have bought them should be enabled to operate them cheaply.

The present navigation laws of this country Mr. Loring described as bad from every point of view. While apparently over-protecting the sailor as a matter of fact, they do him no good whatever, but simply tie the owner and the ship so completely with red tape that it is nearly impossible for them to live up to the law in many cases. With all the restrictions and provisions for the sailors' benefit he thought it generally admitted that the treatment of American sailors was no better than that of foreign, and he recommended an entirely fresh start on navigation laws.

Mr. Loring had no doubt that capital would go into the merchant shipping readily enough if it were assured of a good investment. He considered that while the subsidy was all right for lines of steamships, rebate duties would be better for tramps and lines both. If the merchant marine is stimulated, he concluded, ship building will come naturally.

As attorney for the Atlantic Carriers' association, which includes 400,000 tons of American-built, American-owned, and American manned vessels flying the American flag, Edward C. Plummer took up the discussion of the condition of seamen and devoted some time to disputing the position of the sailors' union as set forth by Mr. Frazier at the close of the first day's hearing. He said it was generally admitted that American legislation regarding sailors had failed; England had tried much the same scheme as is now in effect in this country and had given it up to go back to the customs of the three previous centuries. Owners and masters, he said, do not want to imprison seamen, they simply want to get crews; but the only way to enable them to do this is by obliging the sailor to live up to his contract, just as the owner has to do. He declared conditions in our merchant marine to be far superior, so far as food and lodging are concerned, to those in our navy, which is admittedly the best cared for in the world. The deterioration in the merchant sailor's health is to be attributed, he said, to what happens on shore and not what happens aboard ship.

EXISTING EVILS DUE TO LEGISLATION.

Many of the existing evils he traced directly to legislation, citing many instances of hardship to vessels, their owners, and their captains growing out of too stringent laws and turbulent crews, which he claimed would in many cases be reasonable enough but for outside interference. In regulating these matters as in rehabilitating the merchant marine in other respects, Mr. Plummer thought the British methods might well be adopted. Subsidies he regarded as useful to build up; beyond that, all that would be necessary is the application to the trade of the Atlantic ocean of the same kind of brains that has built up the commerce of the great lakes so remarkably. Free ships would defeat the very object sought; if the subsidy must be continued indefinitely he would oppose it, or of it must be made a burden it would not find much favor with him. But he believed in a plan to make foreign ship owners pay for building up our merchant marine by levying a tonnage tax on foreign bottoms and paying it out in subsidies. This would drive out the least economical foreign freighters—that is, the tramps, generally speaking—and "leave a hole" into which might be fitted an increasing number of American craft.

The most positive statement of its kind which the commission heard in Boston was made by Edward M. Brewer, an owner of sailing vessels only, engaged nearly all the time in foreign trade, who disapproved of subsidies and discriminating duties entirely and declared for free ships. He said he had been in competition all his life with foreign operators, but he dreaded nothing so much as a competition at home for government favors and special privileges. Subsidies and discriminating duties are games two can play out and have already been played too far. He would advise reforming the tariff so as to create freer and larger trade and he put himself on record for the policy of making more business for ships rather than trying to increase the number of the ships themselves.

The commission was given much interesting information as to the workings of the navigation laws by Capt. E. B. Grant, United States shipping commissioner at the port of Boston. He said that since the act of 1898 masters and owners made almost daily complaint to him of difficulties with their crews. He spoke very strongly of the necessity of a law compelling sailors to carry out their contracts; he denounced "run money" as an evil which should be stopped at once; he spoke for a properly regulated system of advancing wages; and, in reply to questions by Senator Lodge and Senator Mallory, said he would approve of laws forbidding boarding-house keepers to go aboard a ship without its master's permission, making compulsory the reference of all disputes between sailors and their commanders to the shipping commissioners, and authorizing some agency which should see that a man sailed on a ship with which he had signed even if he had to be carried aboard bodily.

Capt. John G. Crowley, general manager and treasurer of the Coastwise Transportation Co., and J. L. Manson, secretary of the Boston Marine Society, spoke to the commission on the same general subjects as Capt. Grant treated of from different points of view. Capt. Crowley stated that two or three of his largest vessels, including the seven-masted schooner Thomas W. Lawson, had been built to go into the foreign trade but had never been taken out of the coastwise because of the impossibility of competing with foreigners who paid foreign wages and gave their crews foreign rations. He denied that our sailing ships are under-manned, declaring that in many cases they are much more fully manned than is necessary when one considers the mechanical devices the sailor now has to help him in his routine work. Capt. Manson, asking for protection, suggested subsidies or bounties to all classes of American vessels but thought that free ships would be the worst possible remedy to apply.

The feature of the second day's hearing, which was most noteworthy, was the long discussion by Osborne Howes, secretary of the Boston Board of Fire Underwriters and a small owner in coastwise shipping, who is also a writer on economic subjects. Mr. Howes doubted the statement that had been made at hearings before the commission in other cities to the effect that American citizens "pay tribute" to foreign ships in freights and passenger fares to the extent of $200,000,000 annually. He believed discriminating duties to be dangerous and impracticable and thought they would result in retaliation and would further the British scheme of imperial federation to the detriment of this country. To establish them, either the duties on imports in foreign bottoms must be raised, involving the imposition of taxes on imports now brought in free, which would arouse the opposition both of those who believe the present tariff to be already high enough and of those who would find their merchandise taxed for the first time; or the existing duties on imports must be lowered when the goods are brought in American bottoms, which would be opposed strenuously by the protected business.

It was Mr. Howes' opinion that differential duties would be unfair as taxing a few classes only and that direct subsidies, paid from the income from general taxation, would be more just. He advocated free ships and said that if they could not be had without concession to believers in subsidies he was prepared to withdraw his economic objections to the direct subsidy, though he doubted its efficiency as a permanent relief, for it would place our shipping industry on stilts and when some change in governmental policy knocked the stilts away he foresaw a collapse of the whole fabric. Mr. Howes suggested a dual plan: free ships, unsubsidised and barred from the coastwise trade—though he thought they should not be prohibited the trade between Atlantic and Pacific ports of the United States or the Philippine tar trade; and direct subsidies for American built vessels. He was content to have both of these plans tried and leave the outcome to the law of the survival of the fittest.

In a general discussion with Senator Lodge and Chairman Gallinger, Mr. Howes justified mail subsidies, as distinguished from other bounties, on the ground that they were payments for special service in carrying the mails, defensible because they perfected the mail service even though they were out of proportion to the direct receipts from it. He classed practically all Great Britain's subsidies, except the recent grants to the

Cunard line, under this head of benefits to the mail service, saying that the British bounty to steamers, running from Liverpool to New York might be included in this classification because the vessels carried the fast Canadian mails. Furthermore, he considered some of the English subsidies justifiable on grounds of strategic necessity.

The commission adjourned until after the republican national convention, when it will hold sessions in Chicago, going from there to Detroit, Cleveland and Buffalo.

BOOK REVIEWS.

Prof. Cecil H. Peabody, professor of naval architecture and marine engineering at the Massachusetts Institute of Technology, has written a work entitled "Naval Architecture." The intention of this work is to give in a consistent and connected form the commonly accepted theory of naval architecture. So far as possible the treatment is simple and direct, especially for such subjects as displacement, stability, propulsion, and strength. A satisfactory treatment of some other parts, like waves and rolling of ships, is necessarily somewhat more intricate, but these chapters may be passed over in the first reading, or may be omitted altogether.

The book opens with a statement of rules for computing areas and a discussion of graphical integration and of mechanical integrators. After this introduction the subjects of displacement and stability are given in the simple manner, including the fundamental principles and methods of computation together with forms and examples. Afterward there follows a complete discussion of the surface of buoyancy and of waterlines, to give a firm grasp and broad view of the subjects treated in the preceding chapters; but this discussion is made to stand distinctly by itself so that it can be passed over without invalidating the work that precedes or follows it. The methods for determining displacement and stability are extended and applied to such general problems as adding and moving weights, grounding, docking and launching.

A simple form of modern hydrodynamics is developed and applied to the theory of waves, including the common or trochoidal theory, the theory of irrotational waves, together with the effect of surface tension, and a statement of Scott-Russell's solitary wave. A discussion is given of the rolling of ships in an unresisting medium, in quiet water, and among waves, including experiments on resistance to rolling and the application of the results of such experiments to the determination of the probable maximum rolling of ships at sea.

The treatment of the subjects of resistance and propulsion of ships is founded, as indeed it must be, on the experience of the Froudes. Advantage is taken of the methods for designing screw propellers that have been developed by Naval Constructor Taylor and by Mr. Sidney Barnaby; extensive tables for the application of Taylor's method have been computed for this work. A discussion is given of steering and sailing. Methods are given for the computation of stresses in ships both in quiet water and among waves; also for the computations for bulkheads. Attention is directed to those features which are peculiar to the computations for ships, and it is assumed that the reader is familiar with applied mechanics and the strength of materials. During the development of preparation of this work a careful study was made of standard works on naval architecture, especially by French and English writers, and also of original articles and memoirs in scientific periodicals and in the transactions of scientific institutes and societies. Copious references will be found in the text to the original authorities quoted. While this work is intended primarily for students, it is hoped that it may be found useful by naval architects and ship builders in general.

A. E. Seaton's Manual of Marine Engineering has reached its fifteenth edition, thoroughly revised, enlarged and in part rewritten. The first edition of this manual was written twenty-five years ago, when there was no similar book existing, when Lloyds' had no rules for machinery and the Board of Trade but a few elementary ones, when the admiralty practically premitted each engine builder to follow his own devices and designs and his own rules for sizes, and when the British Corporation did not exist. No better proof of the progress and change which has been made in this quarter of a century can be found than by comparing this new edition with the original. The author has endeavored to follow the plan originally observed, to make every point quite clear and free from ambiguity, and to give all rules and calculations their simplest expression, without having recourse to the higher mathematics. The author has given new methods for the guidance of engineers in determining the indicated horse power for certain speeds of ship in lieu of the old rules with so-called constants from which the student had to make a selection without much to guide him in doing so; tables based on these new rules are given, which will save him much calculation and practice. The examples of steamships' performances are quite modern ones and in every case taken from reports of carefully-conducted trials by eminent ship builders and engineers. The original rules for screw and propellers have been carefully tested by the latest and best experience. The chapter on water-tube boilers has been much enlarged and more fully illustrated. Other chapters have been likewise added to materially in the same manner. Three chapters towards the end are, moreover, entirely new—one on oils and lubricants, a most important subject, seldom dealt with at all in engineering manuals; one on weight of machinery in all its relations and effects; and one on the physical weight and inertia in which the question of vibration and balancing of engines are fully dealt with.

A series of articles by J. W. Kellogg, which ran in Marine Engineering under the subject of "Uses of Electricity on Shipboard," have been reprinted in book form. The purpose of the articles was to satisfy demand for thoroughly practical information regarding the uses of electricity on board ship so that the man who has not had special electrical training but who is called upon to care for an electric plant can prepare himself for the work. The work is practically divided into two parts, the first six chapters dealing with the uses of electricity on shipboard in general, and the appendix dealing with small lighting plants for launches.

Stevenson's Yacht Manual for 1904 is published by Gardner & Cox, 1 Broadway, New York. The volume has been prepared with a view of placing before yachtsmen a working compendium of information. It contains the tide tables, the directions for entering the various harbors and a great deal of information for those who desire to go cruising. It also contains the storm and hurricane warnings, the distance between various ports and a great deal of interesting and curious maritime information.

SHIP YARD NOTES.

Oxner & Story, Essex, Mass., are building a schooner for C. A. Crowell, Boston, Mass.

The New England Ship Building Co., Bath, Me., launched the four-masted schooner William E. Bowie for F. J. Hinkley, Providence, R. I., recently. She is 172 ft. long, 36 ft. beam and 14 ft. deep.

Howard's ship yard, Jeffersonville, Ind., launched the steamer William Garig for Captain W. H. Seese of Baton Rouge, La., recently. The Garig is 175 ft. long, 35 ft. wide and 5 ft. depth of hold.

COMMERCE OF LAKE SUPERIOR.

The commerce of Lake Superior is, of course, the real gauge of the commerce of the great lakes, and the first report for the season for Sault Ste. Marie canals is now in hand. It shows that 272,606 tons of freight passed eastward through the canals to June 1 of the present year, as against 5,076,007 tons to June 1, 1903; and that 177,282 tons of freight passed westward up to June 1, 1904, as against 1,763,849 tons to June 1, 1903. The iron ore shipments through the canal up to June 1 of last year were 4,024,205 tons; up to June 1 of this year only 4,625 tons of ore have gone through the canals. Up to June 1, last year, 1,403,728 tons of soft coal had passed through the canal as against 84,362 tons this year. Up to June 1, last year, also 238,847 tons of hard coal had gone through, as against 43,365 tons this year. Of course the strike of the masters and pilots has been the cause of this backwardness.

It is to be noted that the American canal did not open until May 5 of the present year, while there was considerable traffic in April of last year. The Canadian canal did not open until April 30, with the following traffic for that date: Four passages, two lockages, registered tonnage 48, and 32 tons of freight. Summaries of Sault traffic up to June 1 for three years past are contained in the following table:

Movement of Principal Items of Freight to and from Lake Superior.

ITEMS.	To June 1, 1904	To June 1, 1903	To June 1, 1902
Coal, anthracite, net tons	43,365	238,847	96,521
Coal, bituminous, net tons	84,362	1,403,728	940,645
Iron ore, net tons	4,625	4,024,205	4,458,312
Wheat, bushels	5,126,791	15,347,163	18,761,176
Flour, barrels	173,977	1,353,078	1,570,438

Report of Freight and Passenger Traffic to and from Lake Superior, from Opening of Navigation to June 1 of Each Year for Three Years Past.

EAST BOUND.

ITEMS.	To June 1, 1904	To June 1, 1903	To June 1, 1902
Copper, net tons	2,218	18,890	18,780
Grain, other than wheat, bushels	712,537	5,865,364	3,094,500
Building stone, net tons			7,101
Flour, barrels	173,977	1,353,048	1,570,438
Iron Ore, net tons	4,625	4,021,205	4,458,312
Iron, pig, net tons		130	4,440
Lumber, M. ft. B. M	48,105	160,612	176,957
Silver ore, net tons			
Wheat, bushels	5,126,791	15,347,163	18,761,176
Unclassified freight, net tons	6,116	15,459	10,348
Passengers, number	739	4,611	4,850

WEST BOUND.

Coal, anthracite, net tons	43,365	238,847	96,521
Coal, bituminous, net tons	84,362	1,403,728	940 645
Flour, barrels		30	
Grain, bushels	125		
Manufactured iron, net tons	5,527	18,775	20,294
Salt, barrels	37,418	88,568	104,223
Unclassified freight, net tons	38,506	89,505	106,391
Passengers, number	689	4,893	5 974

Summary of Total Freight Movement in Tons.

	To June 1, 1904	To June 1, 1903	To June 1, 1902
West bound freight of all kinds, net tons	177,282	1,763,849	1,179,458
East bound freight of all kinds, net tons	272,606	5,076,007	5,585,435
Total freight, net tons	449,888	6,839,856	6,764,893

Total number of vessel passages to June 1, 1904 was 806, and the registered tonnage, 578,366.

SITUATION AT HEAD OF THE LAKES.

Duluth, Minn., June 8.—There are now in store at the head of the lakes about 12,000,000 bu. grains, and 4,000,000 more at Port Arthur and Fort William, Ont. Reduction of stocks at all these points for last week was 2,400,000 bu. There were loaded out at Duluth-Superior 1,800,000 bu. while receipts were small at all points. Shipments at Duluth-Superior consisted of 2,000,000 bu. wheat, 360,000 flax and 440,000 other grains, and at Fort William and Port Arthur they were all wheat.

The Swedish ship Ostergotland arrived at Duluth Friday and loaded flour for Montreal at the Duluth-Superior Milling Co.'s mills, under charter to the Great Lakes & St. Lawrence Transportation Co. The British ship Sirius is on the way to Duluth, under charter to the same company, for a load of flour to the seaboard. The Great Lakes & St. Lawrence is gradually getting its own ships out and will probably not charter outside vessels very much longer. These two are run by their ocean masters with lake pilots. Two other ocean ships, English-built have taken cargoes here this week, both of iron ore and both for the Nova Scotia works of the Dominion Iron & Steel Co. These were the Turret Cape and Turret Chief, and are to be followed by others in the same trade. These ships are a modification of the McDougall whalebacks, and were built at Sunderland, England. The departure of these latter cargoes, especially, is interesting, in that it is freight to be shipped through direct, without rehandling, to Atlantic points. The two ships loaded from 1,700 to 1,750 gross tons, equivalent to 53,000 bu. wheat, or 19,000 bbls. flour. They drew 17.5 ft., which was all they were able to load on account of the Welland canal.

Four cargoes of wheat were in the harbor last Thursday aggregating 1,059,000 bu. Two of these were on the Kerr and Reed, of the Provident fleet, each of which had record breaking cargoes of 275,000 bu. Both these cargoes were shipped by A. D. Thomson & Co., for Buffalo. It is only a comparatively few years when lake loads of 60,000 to 75,000 bu. were regarded with admiration. These cargoes of the Reed and Kerr were weighed and loaded into the ships at the rate of 55,000 bu. an hour, and without any especial reason for speed.

The new steel ship Wisconsin, built last winter by the Superior Ship Building Co. for the Hawgood interests, has taken her first cargo, wheat for Buffalo.

Owing to an accident to King's cleaning elevator at Port Arthur, it has been able to treat wheat only in very small quantities the past week or so, and the yards are filled with cars of grain for treatment. New machinery that will almost double the former capacity of this hospital is being installed and should be running in a week or two.

The big lake tug Niagara, from the Sault, lies broken up on the outer side of Knife river reef, 20 miles from Duluth, a victim to a combination of fog and magnetic sands that drew her compass needle. She was on the way to Duluth for the Hugo & Tims contracting outfit, to be towed to Sand Beach, Mich. There were several passengers on the tug, ladies from the Sault, who were taken safely off by the tug Edna G. of the Minnesota Iron Co., which arrived at the scene shortly after the Niagara went on. Probably her boiler and engine may be saved.

BUILDING A LARGE SCOW.

Duluth, June 8.—Whitney Bros. of Superior are building a scow 180 ft. long, and said to be the largest of its class on the lakes. It will have capacity for about 1,200 tons and will be equipped with derricks and hoisting and wrecking machinery. It will be used primarily in their contract at the new government work at the Superior entry. This work, by the way is well started, the laying of subaqueous concrete having been commenced a few days ago. There was considerable delay, some of the machinery that had been installed was found defective and broke down.

Shipments of lumber from the head of the lake and Ashland have been large this spring, and for the past week have averaged, for the two points, about 2,500,000 ft. daily. Up to date, however, shipments have not equalled those of last season, and from Ashland they cannot be as much as last year, on account of the diminished cut.

CIVIC FEDERATION ON LAKE DEADLOCK.

The executive committee of the Cleveland Civic Federation which was appointed to investigate the circumstances leading to the deadlock between the Lake Carriers' association and the Masters & Pilots' association submitted an extended report and was later discharged. After reviewing the evidence, the committee reaches the following conclusion:

"The Lake Carriers' association insist that the relation of a master to his ship is that of a general agent, with possibly the broadest powers known in the law of agency. They say he is the responsible representative of the ship and owner, with power, in case of necessity and unable to communicate with the owner, even to sell the cargo or the ship herself; for the proper exercise of whose judgment in this respect the owner is responsible, and his declaration or admission made during the term of his employment is binding upon the ship and owner to the fullest extent.

"The Lake Carriers' association give us to understand, however, that they would not only be willing to deal and make contracts with an association formed by the mates alone and another association formed by the masters alone, but that they would encourage and facilitate the organization of such unions or associations, as they believe the organization of such separate unions or associations would be along the lines of other separate and independent organizations pertaining to the lake commerce. The Masters & Pilots' association, on the other hand, insist that there is no inconsistency or impropriety in the organization which they have formed consisting of both masters and mates.

"It is the opinion of the committee, based upon the information received by them during these various hearings, that growing out of the change which has been going on so rapidly, which has resulted in the passing of the ownership of lake vessels from individual and private ownership to corporate and syndicate ownership, various abuses have crept in, of which the masters and mates had reasonable ground to complain. But we believe from the same evidence that many, if not all of those grievances, would be corrected and eradicated by the present management of the various lake fleets, and we think we have a right to believe, from statements made by the representatives of the Masters & Pilots' association who appeared before us, that they also believe that many, if not most, of these grievances would be and will be corrected. We further report that, while the different associations are ostensibly divided upon a number of propositions, these differences could readily be disposed of and adjusted if the contending parties could see their way clear towards meeting and negotiating these differences."

MAINE SHIP BUILDERS BUSY.

Maine ship builders are busy. At Portland, William H. Reed will build a four-masted schooner, a five-master, a fisherman and a large steamer for freight and passenger service from New York. At Rockland, Cobb, Butler & Co., have a double-decked four-master of 1,500 tons capacity, for Bonnell & McKown of Boston. The same firm have contracted to build for Crowell & Thurlow of Boston a four-master, to be a duplicate of the schooner Edward H. Cole, except that she will be 10 ft. longer and 6 in. wider with 2,900 tons carrying capacity. I. L. Snow & Co., Rockland, are building a three-masted schooner of 750 tons capacity.

At Rockport, Carleton, Norwood & Co. are building a four-masted schooner of 2,400 tons capacity for Captain J. B. Crocker of Franklin, Mass., to be launched in November.

At Camden, H. M. Bean & Son are building two five-masters for the Coastwise Transportation Co. of Boston. These vessels are for coal trade and will carry 3,600 and 4,400 tons, respectively.

At Woldboro, George L. Welt has begun work on another five-masted schooner for William F. Palmer of Boston.

At Thomaston, Dunn & Elliott have a four-master of 1,200 tons registry, nearly planked, and the same firm has the frame ready for a four-master of 1,000 tons register. Washburn Brothers, Thomaston, have in frame a four-master of 1,000 tons register and later will build a three-master of 7,000 tons.

ITEMS OF GENERAL INTEREST.

Dominic J. Murphy, commissioner of pensions under President Cleveland, was elected on June 7 by the Panama Canal Commission as secretary of that body.

Warren Welch, a well-known marine engineer, died in Chicago this week. His latest steamer was the A. D. Thompson of the Pittsburg Steamship Co.'s fleet.

The Hamburg-American line steamer Deutschland will be taken to Newport News to be docked. This is the first time that this steamer has been docked on this side of the water.

James Hawthorne, who died at his home in Richmond, Me., last week, began steamboating on the steamer Huntress in 1839. He finally became superintendent of the Bangor and Boston line. He was ninety-three years old.

The four cross-channel steamers building for the Midland Railway Co. for the Heysham, Belfast, and Isle of Man traffic, will, it is expected, be found to be the fastest boats running on any of the channel services round the British coast.

Capt. Charles E. Kirtland died at his home in Milwaukee last week. He had been a vessel master for over forty years and sailed on nineteen different vessels, eleven of them belonging to the Goodrich line. He was 77 years old.

Owing to the strike of the lithographers in New York there has been some delay experienced by Lloyds Register of Shipping in publishing the society's American Yacht Register for this year. It is expected, however, that the book will be ready for issue next week, when it will be forwarded to subscribers.

The C. W. Hunt Co., West New Brighton, S. I., N. Y., are going to make a very interesting exhibit at the St. Louis exposition in the shape of an electric storage battery locomotive and cars running on narrow gauge tracks with curves and switches of 12 feet radius. The exhibit will be in the court of the palace of electricity.

The president has appointed Capt. William H. Reeder of the navy, William M. Bradley, of Portland, Me., and Henry M. Waite of Lexington, Ky., a board to select the most available site for a naval training station on the great lakes. The civilian members of the board were required to be residents of states not interested in the controversy as to where the station should be situated.

On June 6 the Brotherhood of Boilermakers & Ship Builders of America announced the election of the following officers: John McNeil, president, and J. Gilthorpe, secretary, both of Kansas City, Kan., were re-elected. Seven vice-presidents, who form a governing body of the organization were elected, including W. M. Hartz, Brooklyn; Edwin Fox, Buffalo, and Dennis Crowley, Albany, N. Y.

A service of steamers is about to be established between Manchester and New Zealand, or at least Manchester is to be added to the ports of call on the regular monthly service maintained by the New Zealand Shipping Co., Ltd. This company is under a contract with the New Zaeland government to run steamers from the West coast of England and Scotland to Auckland, Wellington, Lyttleton, Port Chalmers and Dunedin, taking through cargo for all New Zealand ports, with liberty to call at the Cape (for passengers only) and at Australian ports. The steamer Whakatane (8,100 tons) is to load at Bristol on May 10, at Glasgow May 20, Liverpool May 28, and Manchester on the 31st.

CANADIAN SHIPPING NOTES.

The Penetanguishene, Ont., tug Shawanaga has been sold to a firm at Sault Ste. Marie, Ont.

A new steamer named the Sovereign, built at Point St. Charles, Montreal, has been placed on Rice Lake, Ont., a section of the Trent Valley canal.

The Montreal Transportation Co. has had the hull of the steamer Advance, which was burned at Sault Ste. Marie, Ont., towed to Kingston, where it will be rebuilt.

The steamer St. Lawrence, which was formerly on the run between Prince Edward Island and the mainland, is now employed as a cattle transfer, and will be used at Montreal.

The tug Geyser of Bay City, Mich., has been purchased by the Boone Construction & Dredging Co., Owen Sound, Ont., and will be used in connection with the harbor construction work.

The Ship Owners Marine Insurance Co. of Windsor, N. S., has paid a dividend of 6 per cent. on the year's operations. C. de W. Smith was re-elected president, and J. E. Curran secretary.

The steamer Admiral, owned by the North American Transportation Co., ran into the wharf at New Carlisle, N. B., May 27, and was badly damaged. She had 100 passengers on board, but no one was injured.

The Great Lakes & St. Lawrence Transportation Co. have chartered the new steamers Sirius and Ostergotland, to trade between Duluth, Port Arthur, Fort William and Montreal, as well as intermediate ports, with general cargo.

The steamer City of Windsor has been sold to Captain P. M. Campbell, formerly of the Northern Navigation Co., for $3,700. He will place her on a run between Collingwood and Sault Ste. Marie, Ont., calling at intermediate ports.

The St. John (N. B.) city council and the Canadian Pacific railway are still at "outs" in reference to wharf accommodation at that port. The company contends that the city, in asking it to give up 1,600 ft. of waterfront space, wants too much.

The Montreal & Cornwall Navigation Co. has purchased the hull of the steamer White Star of Toronto, and has towed it to Montreal, where it will be rebuilt. The White Star ran between Toronto and Oakville, Ont., and was burned in 1903.

The Valley Steamship Co. held its annual meeting at Annapolis, N. S., May 31; when the following officers and directors were elected: Secretary and treasurer, F. C. Whitman; general manager, C. W. Collins; other directors, F. W. Pickles, S. W. Pickup and S. E. Bancroft.

An investigation will be made by the Department of Marine into the loss of the Turret Bay, which was wrecked off St. Paul Island, N. S., recently. The Turret Bay was owned by the Canadian Lake & Ocean Navigation Co., and was under charter to the Dominion Coal Co., as a collier between Sydney, N. S., and Montreal.

The Dominion government is negotiating with the Armstrong-Whitworth Co., Elswick-on-Tyne, Eng., for the construction of a couple of ice-breaking steamers, one to be used on the Gulf and the other in the St. Lawrence river, with a view of lengthening the period of navigation. A contract is expected to be closed before the end of June.

An order in council has been issued declaring that vessels registered out of Canada, but engaging in the coasting trade of Canada, shall be subject to the Steamboat Inspection act unless they have a certificate of the current year from the Imperial Board of Trade, the English, French or Norwegian Lloyds, or the British Corporation for the Survey and Registration of Shipping.

The vessels which it is proposed to employ in the Canadian-Mexican line are to be British, of not less than 3,000 tons, with passenger accommodation, and to have a speed of not less than 10 knots an hour. The Mexican government will give $100,000 yearly for the Pacific coast service and $20,000 for the Atlantic coast service, and the Canadian government will also provide subsidies. The contract will be entered into for the service for a term of five years.

The department of marine has entered into contracts for the installation of wireless telegraph stations at Faure Point, Heath Point, Point Armour and Belle Isle, Que., and it was proposed to remove the station at Cape Race, Newfoundland, to a more suitable point. Thirty submarine bells will be placed at different points, ten to be placed this year, and it had been arranged to add a number of additional lights in the channel between Montreal and Quebec, so that navigation could be carried on uninterruptedly by night as well as by day.

The arrangement made between the Dominion government and Columbiere & Co. to operate a regular steamship service between Havre, France, and Montreal, has been cancelled, the required service not having been provided. Negotiations are in progress with the Canadian Lines of Toronto, a company in which W. Mackenzie, president of the Canadian Northern railway; W. Peterson, of Newcastle-on-Tyne, Eng., and the Armstrong-Whitworth Co., of Elswick-on-Tyne, Eng., are interested, with a view of establishing a regular service.

TRADE NOTES.

The Atlantic Works, Incorporated, Philadelphia, Pa., has received an order from the United States government for a 30-in. automatic knife grinder, to be used at the League Island navy yard.

The latest catalogue of the Westinghouse Electric & Manufacturing Co. is devoted to the industrial and sociological aspects of the work and is illustrated with camera pictures. The book is bound in dark green and embossed in gold and is printed in two colors, black and light green. It is an excellent bit of book-making. The story takes one back for nearly twenty years, when the company was organized, and follows its growth step by step since. A great deal of time and money has been expended on the work and the book is one that will doubtless be preserved by all who are so fortunate as to receive a copy of it.

The Great Lakes Engineering Works, Detroit, Mich., have just issued catalogue "E," which is devoted to Great Lakes compressors. It is bound in light green and embossed in gold and is a very pretty little catalogue. In the preface the company says that the general line of thought of determining the design of the compressor included compactness, saving in floor space and foundations, elimination of wear due to gravity at an angle to line of motion, a proper relation to crank and fly-wheel effort, quick access to all parts without disturbance of other parts, an improved cooling system and as nearly as possible a self-contained machine. The vertical design suggests itself at once as fulfilling several of these requirements. The whole machine with all its working parts can be comprehended at a glance. There is nothing out of sight or under the floor—the complete mechanism is in full view at all times. The catalogue will be sent to anyone interested.

OBITUARY.

Capt. John Jenkins of Marine City, who sailed the steamer Sawyer for a number of years, died last week of nervous prostration. He leaves a widow and four children.

Edmond A. Graham, who was for many years connected with the vessel business, died at St. Joseph, Mich., last week. He was one of the organizers of the Graham & Morton line and contained a considerable interest in the company until the reorganization, which took place about a year ago, when he disposed of his holding to John H. Graham, his brother. He was sixty-six years old and had been ill for some time.

WANTED and FOR SALE Department.

FOR SALE.

Steamer for Sale at Cost, $13,500.

The old Anchor Line twin-screw steamer Gordon Campbell. Two decks, gangways, hoisting machinery, etc. Suited to carrying coal, lumber, ties, package freight, etc. Spent $3,500 in repairs this year. Other business requires my undivided attention and I will sell for cost to me. W. F. Carroll, 1011 Ashland block, Chicago. tf

For Sale.

All my stock in the Chequamegon Bay Transportation Co., 75 shares; good established business. Reason for selling—going west. Address, Box 343, Ashland, Wis. July 28

FOR SALE.

Yacht for Sale.

Yacht, perfect beauty, for sale at $1,350; length, 40 ft.; beam, 7 ft. Draught aft about 34 in., forward about 9 in., amidships about 18 in. For full particulars address Box 66, Marine Review, Cleveland. tf

Yacht for Sale.

New beautiful 100-ft. steam yacht, fully equipped. Owner physically unable to use yacht. Will sell for any reasonable offer. Yacht can be seen in Detroit. Address M. J. Steffens, 57 East Twenty-second st., Chicago. tf

WANTED.

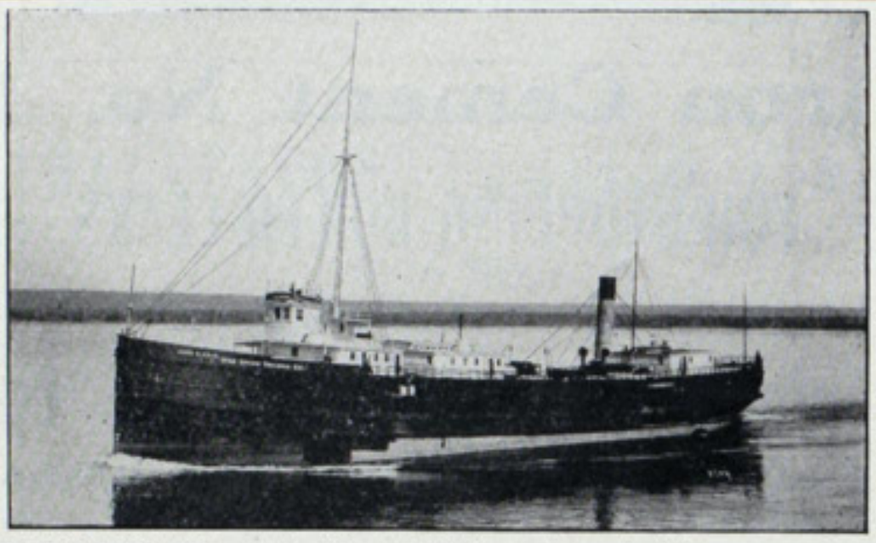
Gasoline Launch.

Wanted gasoline launch from 40 to 50 ft. Reliable power, cabined and fully equipped. Must be up to date. C. H. Krause, Keweenaw Bay, Baraga Co., Mich. June 2

Steam Yacht Wanted.

Comfortable cruising steam yacht wanted immediately, 80 to 100 ft. long, about 15 ft. beam. Speed about 15 miles. Send full description hull and machinery with price to A. A. Wright, 68 D'Arcy St., Toronto, Ont.

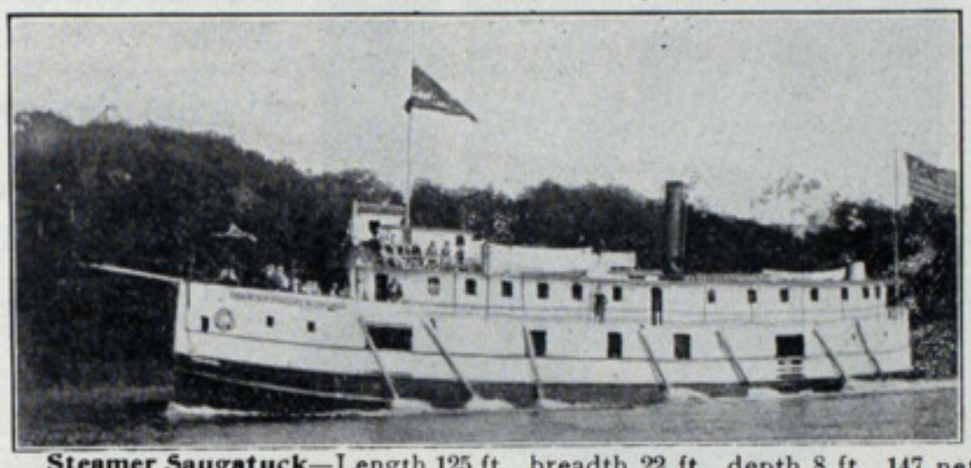
PROPOSALS FOR DREDGE.—Mississippi River Commission, Fullerton Building, St. Louis, Mo, May 17, 1904.--Sealed proposals, in triplicate, for construction and delivery of self-propelling hydraulic dredge and ponton pipe line will be received here until 12 noon, standard time, June 25, 1904, and then publicly opened. Information furnished on application. WM. B. LADUE, Capt., Eng'rs Sec'y. June 23



FOR SALE—The Union Transit Co.'s package freight steamer John M. Nichol. Rated A1½; length 263 ft., beam 41 ft., depth 26 ft. Triple expansion engines with 900 indicated H. P. Steel boiler house enclosing two Scotch boilers with steam pressure of 150 lbs. Steam capstans, windlass and steering apparatus. About $30,000 laid out for repairs in the past year. Retiring from business and will sell at sacrifice. Address H. C. French, 994 Ellicott Square, Buffalo, N. Y. June 16

Chicago, Saugatuck & Douglas Trans. Co.

This boat line, two steamers, docks, etc., for sale.



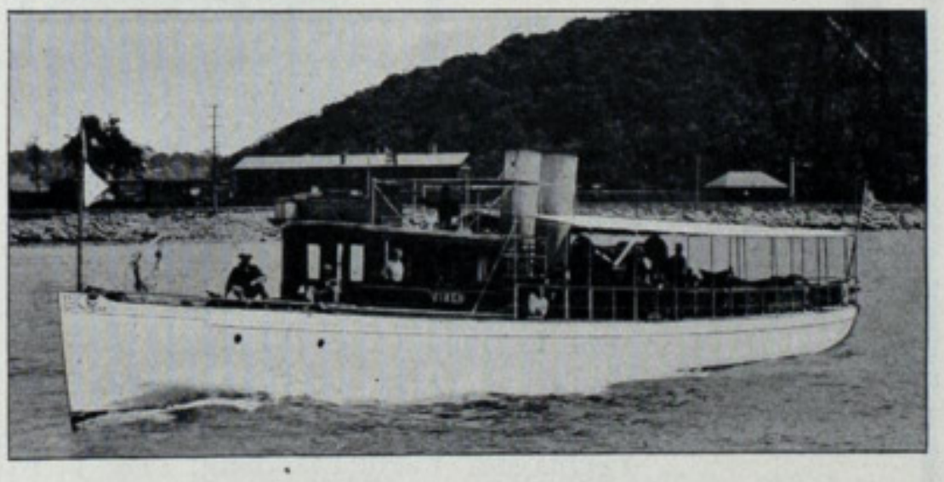
Steamer Saugatuck—Length 125 ft., breadth 22 ft., depth 8 ft., 147 net tons. Licensed to carry 84 regular, 225 excursion passengers.

Steamer Chas. McVea—Length 135 ft., breadth 24 ft., depth 10 ft., 263 net tons. Licensed to carry 91 regular, 300 excursion passengers.

For full particulars apply to Griffin & Henry, Saugatuck, Mich. June 16

Steam Yacht Catherine.

FOR SALE—Length 78 ft., beam 18 ft., triple expansion engines, water tube boiler, allowed 200 lbs; electric light, search light, mahogany deck house 9 by 16, power launch, complete outfit, all in first-class condition. One of the best family cruising yachts on the Lakes. Inquire Wickes Bros., Saginaw, Mich. June 9



FOR SALE—High speed yacht, formerly named Vixen; speed of twenty miles per hour guaranteed. Address Gas Engine & Power Co. and Chas. L. Seabury & Co., Consolidated, 11 Broadway and Morris Heights, New York City. June 2

Steel Castings for Special Purposes.

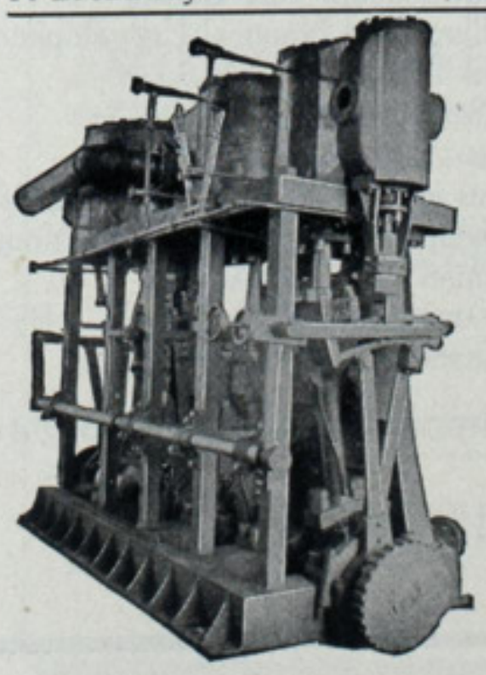
Our complete facilities enable us to undertake the manufacture of high grade steel castings for almost any purpose. Write us for particulars.

Open Hearth Steel Castings for locomotives, shipbuilding, electrical, pump and general machinery purposes. Subject to U. S. Government, Lloyd's, Railroad and other specifications.

Rail or Water Deliveries.

Seaboard Steel Casting Company,

Chester, Pa.



Chas. P. Willard & Co.,

F. C. WALTER, MANAGER,

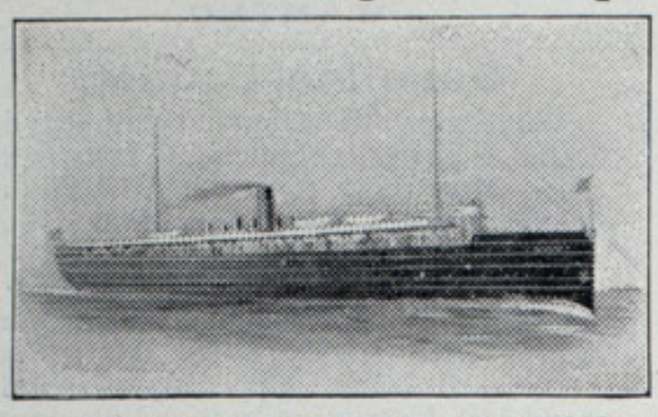
30 W. Randolph St., CHICAGO.

Builders of

Marine Engines and Boilers,
Paddle Wheel Engines,
Boat Machinery,
High Pressure, Compound and Triple Expansion Engines,
Yachts and Launches.

Write for Catalogue.

Northern Michigan Transportation Co.



Chicago, Ludington, Manistee, Charlevoix, Petoskey, Harbor Springs, Mackinac Island.

STEAMSHIPS MISSOURI, ILLINOIS and KANSAS.

Our 1904 Booklet mailed free on application. Address,

R. F. CHURCH, G. P. A. - Chicago.

The Niagara, St. Catharines & Toronto Railway & Navigation Co.

St. Catharines, Ont.

Boats leave Toronto
8 A.M., 11 A.M., 2 P.M. AND 5 P.M.,
for Niagara Falls and Buffalo, N. Y.

Cars leave Niagara Falls, N. Y.,
6.10 A.M., 9.10 A.M., 12.10 P.M. AND 5.10 P.M.
to connect with boats at Port Dalhousie.

Boats leave Port Dalhousie
8 A.M., 11 A.M., 2 P.M. AND 7 P.M.

FOR FURTHER INFORMATION APPLY TO

H. Davis, G.P.A. **E. F. Seixas, Gen. Mgr.**

One of these binders, that will hold

52 ISSUES of the

Marine Review

will be mailed to any address on receipt of

$1.

MARINE REVIEW,
39-41 Wade Bldg.
CLEVELAND, O.

SMOOTH-ON
TRADE MARK

Iron Cement No. 1

FOR STOPPING BOILER LEAKS.

Send for Catalogue and Prices.

SMOOTH-ON MANUFACTURING CO.

572-74 Communipaw Ave., Jersey City, N. J., U.S.A.
Chicago Office, 61 N. Jefferson Street.

Books on Yacht and Launch Building and Sailing

Text Book of Marine Motors. By Captain Du Boulay	$2.50
Cruises in Small Yachts and Big Canoes. By Speed	2.50
How to Build a Motor Launch	1.00
How to Build a Model Yacht	1.00
How to Build a Speed Launch	1.00
Manual of Yacht and Boat Sailing. By Dixon Kemp	12.00
Navigation for Yachtsman. By V. J. English, R. N.	7.50
Yachts and Yacht Handling. By T. F. Day	1.00
Marine Motors and Marine Launches. By Roberts	1.00
Yacht Etiquette. By Patterson	1.00
Practical Boatbuilding. By Nelson.	1.00
Practical Boat Sailing. By Davies	2.00
Patterson's Illustrated Nautical Encyclopaedia	3.00
Sails and Sail Making	1.25
Small Boat Sailing. By Knight	1.50
Small Yachts. By Kunhardt	10.00
Steam Yachts and Launches. By Kunhardt	3.00
Simple Elements of Navigation. By Young	2.50
The Yachtsman's Kedge Anchor	1.00
Tables for Constructing Ships' Lines. By Hogg	2.00
Yacht Architecture. By Dixon Kemp	16.80

SENT POSTPAID TO ANY ADDRESS

THE PENTON PUBLISHING COMPANY, CLEVELAND, OHIO.

Mexican - American Steamship Co.,

The Rail and Water Route to Mexico, via New Orleans, La., and Galveston, Texas.

A. L. ROBY,
Vice Pres't and Mgr.
NEW ORLEANS, LA.

F. N. LUFKIN,
Sec'y and Treas.
NEW ORLEANS, LA

General Offices: 632 Gravier Street.
New Orleans, La.

New Orleans-Tampico-Vera Cruz Line

S. S. NOR. **S. S. NORHEIM.**

Freight and passenger sailings every two weeks, connecting with all railways from Tampico and Vera Cruz for interior points.

L. PALMER, Agent, New Orleans, La.

GALVESTON - TAMPICO LINE

S. S. IRIS. **S. S. FARMAND.**

Weekly Sailings.

Fast freight service from the United States to Mexico, via Galveston at Tampico, connecting at Tampico with the Mexican Central Railway for all interior points.

W. H. RICHARDSON, Agent, Galveston, Texas.

United Fruit Co's Steamship Lines.

CARRYING FAST UNITED STATES AND FOREIGN MAILS.

First-Class Passenger Service to Jamaica.

Weekly Sailings from Boston and Philadelphia.

Summer Rate May 1st to October 1st. { **One Way, $35** / **Round Trip, $60**

FOR FULL INFORMATION APPLY TO

DIVISION PASSENGER AGENT,

Long Wharf, Boston, or Pier 5, No. Wharves, Philadelphia.

The Erie & Western Trans. Co.

ANCHOR LINE.

PASSENGER SERVICE Steamers.

India. China. Japan. Tionesta.

PORTS OF CALL.

Buffalo. Erie. Cleveland.
Detroit. Mackinac Island. Sault Ste. Marie.
Marquette. Houghton. Hancock.
Duluth.

FREIGHT SERVICE Steamers.

Alaska. Codorus. Mahoning. Schuylkill. Conestoga.
Muncy. Clarion. Delaware. Juniata. Lehigh.
Lycoming. Susquehanna. Wissahickon. Conemaugh.

PORTS OF CALL.

Buffalo. Erie. Cleveland. Detroit.
Sault Ste. Marie. Marquette. Houghton. Hancock.
Duluth. W. Superior Chicago. Milwaukee.

J. C. Evans,
Western Manager,
BUFFALO, N. Y.

Chas. E. Markham,
General Passenger Agent.
BUFFALO, N. Y.

AMERICAN LINE

PLYMOUTH
CHERBOURG
SOUTHAMPTON

CALLING AT CHERBOURG WESTBOUND.

Sailing From New York Every Saturday at 9:30 a. m.

St. Louis (11,629 tons)
St. Paul (11,629 tons)
New York (10,674 tons)
Philadelphia (10,433 tons)

Special Express Train from Plymouth and Southampton to London and between Cherbourg and Paris.

RED STAR LINE

NEW YORK
ANTWERP
PARIS

Sailing Every Saturday at 10:30 A. M.

Finland (12,760 tons)
Kroonland (12,760 tons)
Vaderland (12,736 tons)
Zeeland (11,905 tons)

One of the Shortest Routes to BELGIUM, HOLLAND, FRANCE, GERMANY, THE RHINE, SWITZERLAND and ITALY.

9 Broadway, New York.

Broad and Sansom Sts., Philadelphia.
India Building, 84 State Street, Boston.
1306 F St., N. W., Washington, D. C.
219 St. Charles St., New Orleans
90-96 Dearborn St., Chicago.
Century Building St., Louis.
Guaranty Building, S., Minneapolis.
21 Post St., San Francisco.
375 Robert St., St. Paul.
41 King St.. East Toronto.
17 St. Sacrament St.. Montreal.

PIERS: 14 & 15 NORTH RIVER, FOOT OF FULTON ST., NEW YORK.

GOODRICH LINE STEAMERS

NINE BOATS.

Passenger and freight service between Chicago, Milwaukee, Racine, Sheboygan, Manitowoc, Green Bay Ports, Grand Haven and Muskegon.

H. W. THORP,
Gen'l Mgr.

R. C. DAVIS,
G. P. A.

General Office: CHICAGO, ILL.

Manitou Steamship Co.,

"The Mackinac Line."

In service the famous steel constructed
STEAMSHIP MANITOU.

Three times each week between Chicago, Frankfort, Northport, Charlevoix, Petoskey, Harbor Springs and Mackinac Island.

Passenger Service Exclusively.

Illustrated booklets, route and rate books, containing about **200 different combination tours** to select from, mailed free for the asking. Address

JOS. BEROLZHEIM, G. P. A., Chicago.

DON'T BUY A GASOLINE MARINE ENGINE until you have investigated **"THE WIZARD."**

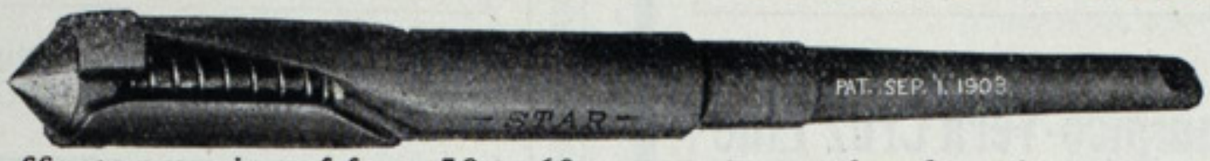
CAPACITY, THREE TO SIX HORSE POWER. WEIGHT, 225 LBS. NO VIBRATION. PERFECT CONTROL. MARVELOUS SIMPLICITY OF CONSTRUCTION. RECORD BREAKING ECONOMY. HIGH-GRADE IN EVERY RESPECT. CAN BE USED ALSO FOR ELECTRIC LIGHTING AND GENERAL WORK WHEN NOT IN BOAT.

Manufactured by **THE TEMPLE PUMP CO.,** CHICAGO, ILL., U. S. A.

Established 51 years.

STAR CONDENSER PACKING TOOL.

J. H. Schlosser Patent.



Manufactured for 5/8-in., 3/4-in. and 7/8-in. tubes.

This tool effects a saving of from 50 to 60 per cent. over hand work and any other tool.

Exclusively Manufactured by **MATTESON & DRAKE, 706-707 Bourse, PHILADELPHIA.**

Phone Call 591A Greenpoint.

LANE & DeGROOT.

METALLIC LIFE BOATS.

(Formerly Raymond's)

Metallic Life Rafts, Cork Life Preservers, etc., approved by the U. S. Supervising Inspectors. Also Wood Boats of every description. Repairing of every kind promptly attended to.

305-315 Vernon Ave., Long Island City, N. Y.

THOS. DREIN & SON,

TATNALL ST. BELOW RAILROAD, WILMINGTON, DEL.

BUILDERS OF METALLIC LIFE BOATS AND RAFTS, YACHTS AND PLEASURE BOATS.

LIFE PRESERVERS.

OUTFIT FOR LAKE STEAMERS A SPECIALTY.

Neversink Cork Jackets and Life Belt.

Warranted 24 pounds. Buoyancy and full weight of Cork, as required by U. S. Inspectors.

Consolidated Cork Life Preservers. Ring Buoys and Fenders.

SAFEST. **CHEAPEST.**

Approved and adopted by U. S. Board of Supervising Inspectors. Also adopted by the principal Ocean, Lake and River Steamer Lines as the only Reliable Life Preserver. Awarded four Medals by World's Columbian Exposition.

METALLIC and WOODEN LIFE BOATS.

Metallic Life Rafts. Marine Drags.

Manufacturers of Woolsey's Patent Life Buoy—the lightest, cheapest and most compact life raft known.

DAVID KAHNWEILER'S SONS.

437 Pearl Street, New York City.

Send for Illustrated Catalogue.

British Admiralty Charts The latest Editions of Charts, Plans and Sailing Directions Published by the British Admiralty. Can be obtained from Admiralty Agent by Appointment.

J. D. POTTER,

145 MINORIES, LONDON, ENGLAND.

OFFICIAL CATALOGUE OF CHARTS (380 pages) 1s.

An Abridged Catalogue of Charts of Nautical Books (free on application.)

PHOSPHOR BRONZE.

REG. TRADE MARKS

"Phosphor-Bronze"

DELTA

THE PHOSPHOR BRONZE SMELTING CO. LIMITED, 2200 WASHINGTON AVE., PHILADELPHIA.

"ELEPHANT BRAND PHOSPHOR-BRONZE"

INGOTS, CASTINGS, WIRE RODS, SHEETS, ETC.

—DELTA METAL—

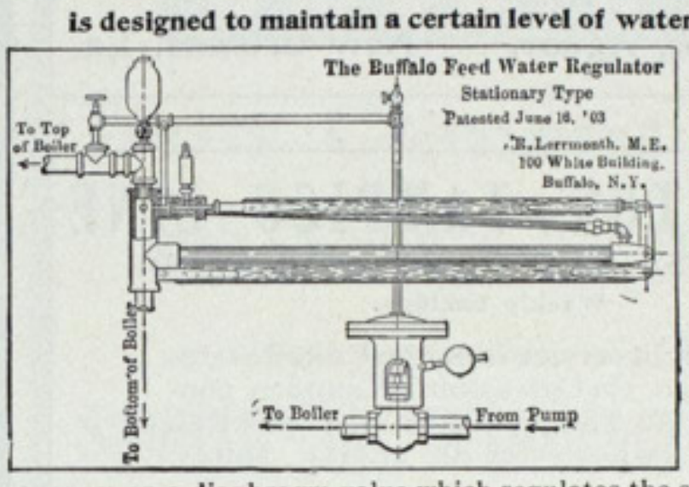
CASTINGS. STAMPINGS AND FORGINGS.

ORIGINAL AND SOLE MAKERS IN THE U.S.

DELTA METAL

BUFFALO FEED WATER REGULATOR

is designed to maintain a certain level of water in a steam boiler.



Only natural forces operate the device which consists of the heating and cooling of a straight copper tube with its corresponding expansion and contraction. The heat is supplied from the steam in boiler and the cooling medium is the water taken from the boiler. The actuating force, therefore, is certain. By this motion a small valve is operated to increase or decrease the pressure on a diaphragm valve which regulates the supply of water to the boiler.

The Perfect Working of this Regulator is Guaranteed.

ROBERT LEARMONTH,

100 White Building, -:- BUFFALO, N. Y.

Buffalo

Wrought Steel Ranges

Are the Best.

Steamboat and Barge Ranges with Rotary Grates.

No Cog Wheels to Warp or get out of order.

Don't take our word for it but ask some one using them.

Russell & Watson, General Steamboat Work

BUFFALO, N. Y. Send for Catalogue.

AGENTS—Topky Bros., Ashtabula Harbor, Ohio.
H. C. Weber & Co., Detroit, Mich.
John Black, So. Chicago, Ill.
Pritzlaff Bros., Milwaukee, Wis.

A TRUSCOTT BOAT.

SIMPLE. SAFE. SPEEDY. RELIABLE.

It may be possible to build better and safer boats but it hasn't been done yet. We send a completely illustrated catalogue and price list free, which tells you all about boats and why Truscott Boats Excel.

TRUSCOTT BOAT MFG. CO. ST. JOSEPH, MICH.

The Wm. Cramp & Sons Ship and Engine Building Co.

PHILADELPHIA, PA.

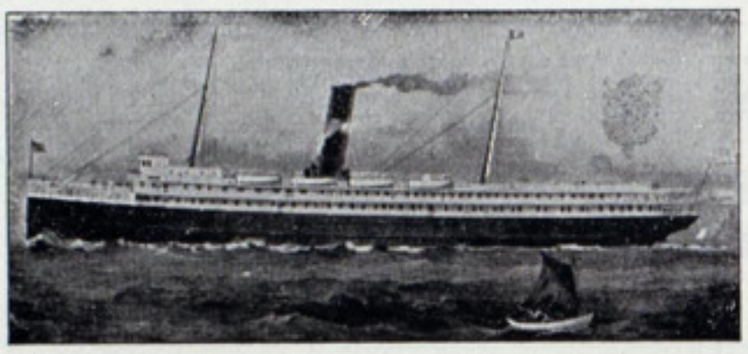
BRASS FOUNDRY

PARSONS MANGANESE BRONZE

PARSONS WHITE BRASS

Propeller Castings of all kinds a specialty.
Castings and Ingots for marine and land purposes of high tensile strength and best composition

ROACH'S SHIP YARD.



Delaware River Iron Ship-Building & Engine Works Chester, Pa.

Builders of Steamships and Marine Machinery.

SHIP-BUILDING IN ALL ITS BRANCHES.

NEW YORK OFFICE, MORGAN IRON WORKS Foot E. Ninth St.

Fore River Ship and Engine Co.

Successors to Fore River Engine Co.

Steel Ship and Marine Engine Builders.

CONTRACTORS FOR

U. S. Torpedo Boat Destroyers Lawrence and Macdonough.
U. S. Protected Cruiser Des Moines.
U. S. Battleships New Jersey and Rhode Island.
U. S. Steam Light-Vessel No. 72.

OFFICE AND WORKS, QUINCY, MASS. U. S. A.

The Atlantic Works,

Builders .... of Steamships, Steam Yachts, Tow Boats Etc

EAST BOSTON MASS.

Marine Engines, Boilers and Tanks.
Heavy Machinery and Plate Iron Work
Three Marine Railways.

Risdon Iron Works

Build STEEL AND IRON SHIPS

MARINE WATER TUBE BOILERS, ENGINES

Works—Potrero. Office—Steuart & Folsom Sts.
SAN FRANCISCO, CAL.

Georgian Bay Engineering Works,
Midland, Ontario.

Designers and Builders of Dredges, Steel Tugs, Yachts, Launches and Light Vessel Work.

Hoisting Engines, Derricks and Contractors' Plant.

Marine Boiler and Engine Repairs Promptly Executed.

The Allen Dense-Air Ice Machine

Contains no chemicals, only air. Proven by many years' service in the tropics on United States men-of-war, steam yachts and passenger steamers.

A HUNDRED ARE IN DAILY SERVICE ON STEAMERS.

H. B. ROELKER, 41 Maiden Lane, NEW YORK

Consulting and Constructing Engineer. Designer and Manufacturer of Screw Propellers.

THE LOCKWOOD MANUFACTURING CO.

EAST BOSTON, MASS.

ENGINEERS AND MACHINISTS.

Builders of STEAMSHIPS, TOW BOATS and MARINE ENGINES
REPAIRING OF HULLS AND MACHINERY.

W. & A. FLETCHER CO.

NORTH RIVER IRON WORKS.

MARINE ENGINES, BOILERS, Etc.

Hudson, 12th and 14th Streets, Hoboken, N. J.
Take Ferry from foot of West 14th St., N. Y.

The Shipowners Dry Dock Co.

Chicago, Ill.

Building and Repairing of Steel and Wooden Ships with economy and dispatch.
Yard and Dry Docks: Halstead St. and North Branch.
Largest Dry Dock: 480 ft. on keel blocks.

Office, 381 No. Halstead St. Phone, North 1658.

MANITOWOC DRY DOCK COMPANY

SHIP BUILDERS

Facilities for Repairs to Steel and Wooden Vessels.

MANITOWOC - WIS.

Office Phone { Long Distance 423. Zenith 423.
Residence { Long Distance 719-4. Zenith 846.

GOGEBIC STEAM BOILER WORKS,

J. F. DACEY, Manager.

Boilers, Tanks and Sheet Iron Work,
Boiler Fronts and Grate Bars.

SPECIAL ATTENTION GIVEN TO REPAIRING.

Office and Works:
409 LAKE AVE. SOUTH. DULUTH, MINN.

A NEW MAP

showing in detail the entire

WATER FRONT OF BUFFALO, N. Y.

Giving Sounds, Principal Buildings, Railroad Connections, Etc. A copy will be forwarded to responsible parties for inspection, on request.

Price, Cloth Backed, $7.00.

Marine Review, 39-41 Wade Bldg., Cleveland, O.

MASTERS AND ENGINEERS ATTENTION!

When in need of Repairs to Engine or Boiler, Call on

THE MARINE IRON CO., Duluth, Minn.

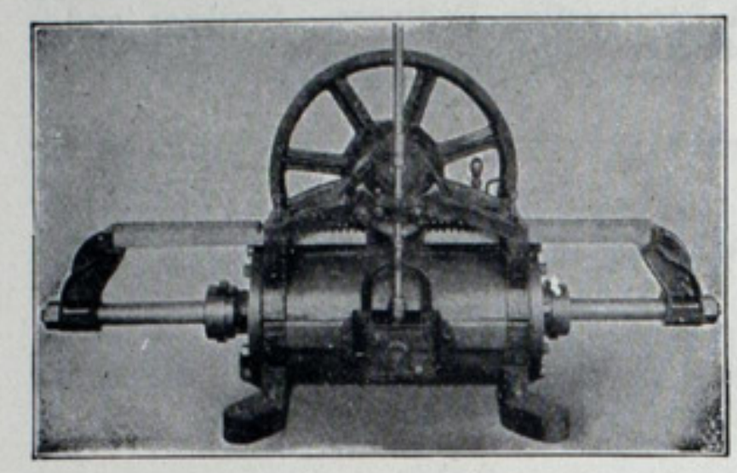
FOR SHOP, FOUNDRY, BLACKSMITH AND BOILER WORK.
SUPPLY BOAT AVAILABLE AT ALL HOURS.

Foot of 12th Ave., on the Duluth Dredge & Dock Co. Dock
Old Phone No. 1270.

A STEAM STEERER

DIRECT AND POSITIVE

QUICK ACTING. SPECIALLY ADAPTED



for Steam Yachts, Ferryboats, Lake, Ocean and Harbor Tug Boats.

Send for Catalogue and Particulars

MOULTON STEERING ENGINE CO.

17 State St., NEW YORK CITY.

THE ROBERTS

Safety Water Tube Boiler Co.

MANUFACTURERS OF

High Grade Marine Water Tube Boilers.

Generators of the Highest Quality of Steam.

Nearly 1500 in use.

Send for Circulars and Stock Sheet.

Works:
RED BANK, N. J.
Phone, 49 Red Bank.

Main Office:
39 Cortlandt St.,
NEW YORK, N. Y., U. S. A.
Phone, 599 Cortlandt.

Cable Address:
"BRUNIVA."

AIDS TO NAVIGATION

are of vital importance to vessel interests.

SCHERZER ROLLING LIFT BRIDGES

aid navigation and meet with the approval of all vessel interests, because of the wide and unobstructed channel provided for navigation, enabling vessels to pass easily and rapidly through the draw.

The SCHERZER ROLLING LIFT BRIDGE Co.,

Main Offices: 1616 Monadnock Block,
CHICAGO, U. S. A.

PARTIAL LIST OF

TUGS

ON THE GREAT LAKES USING

Beck Pat. Steam and Hand Steering Gear.

"Dickenson"	"Spaulding"	"Tomlinson"
"Protection"	"Duncan City"	"Lutz"
"Industry"	"Welcome"	"M. G. Hausler"
"Prodigy"	"Golden"	"Van Schaick"

Pawling & Harnischfeger,

CLINTON & SO. WATER STS.
MILWAUKEE, U. S. A.

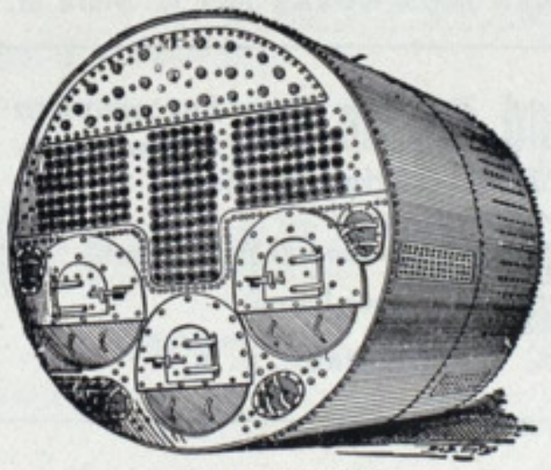
"FOREST CITY" MARINE PAINT

A Paint Made Expressly for This Purpose

The Forest City Paint & Varnish Co.,

CLEVELAND, OHIO.

Northwestern Steam Boiler & Mfg. Co.



DULUTH, MINN.

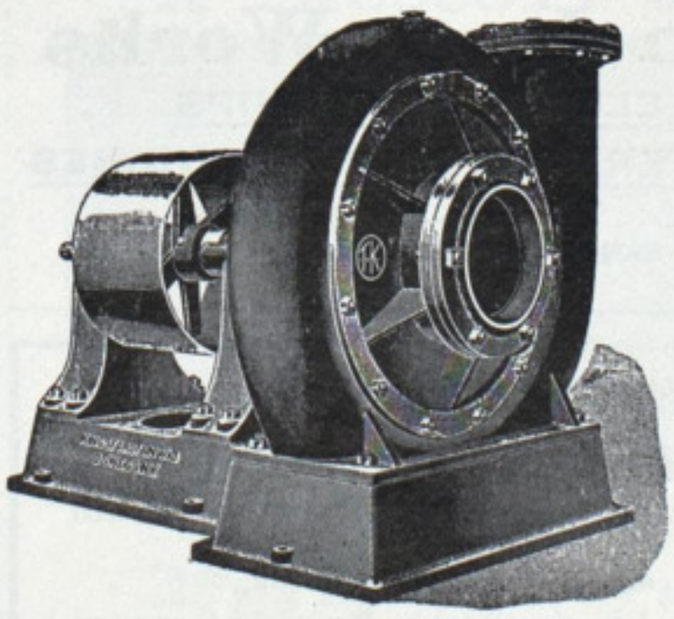
MANUFACTURERS OF

Boilers, Engines and Machinery.

Special facilities for Marine Work. Repairs promptly attended to Night or Day.

We carry a complete line of Marine and Engineers' Supplies.

TELEPHONES:
OFFICE AND WORKS, 615.
Residence Calls:
M. A. RYAN, Pres. and Gen'l Mgr., 776 R.
J. H OPPERMAN, Secretary, 579 R.
E. KRIZ, Superintendent, 557 M.



DREDGING, WRECKING
CIRCULATING
AND BALLAST PUMPS.

MARINE BOILERS.

Kingsford Foundry & Machine Works,

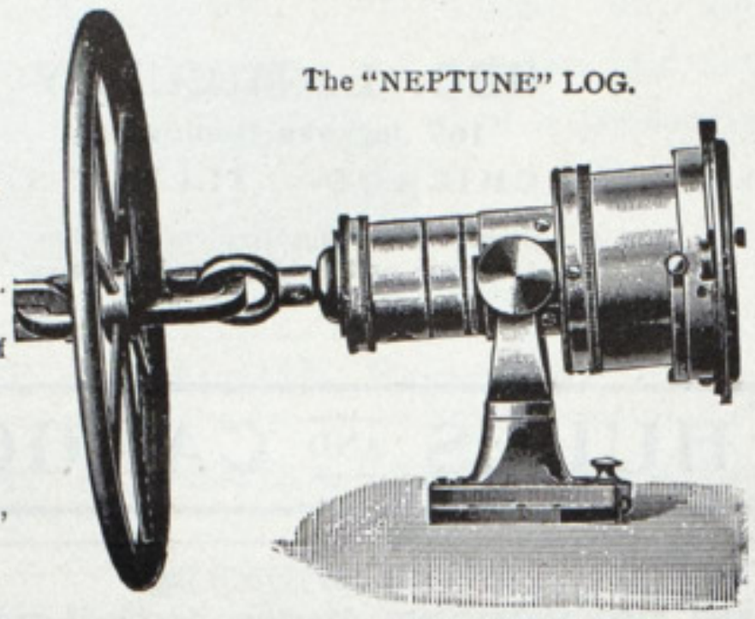
OSWEGO, N. J.

THOMAS WALKER & SON,

BIRMINGHAM, ENGLAND.

THE "NEPTUNE" SHIP-LOG With Ball Bearings for HIGH SPEEDS.

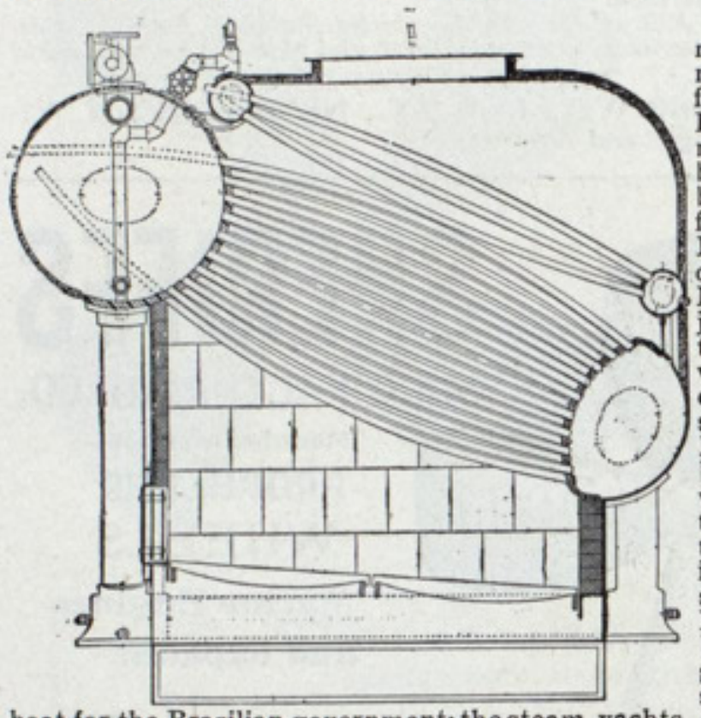
Also makers of the "CHERUB" and "HARPOON" SHIP-LOGS.



The "NEPTUNE" LOG.

MAKERS TO THE BRITISH NAVY.

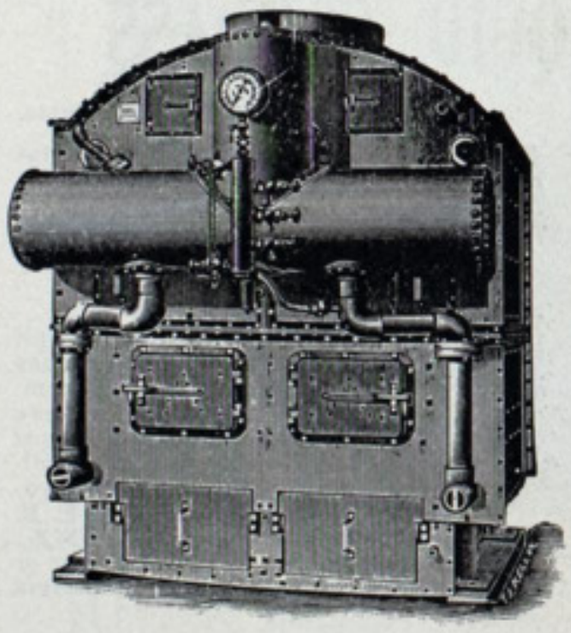
THE MOSHER PATENT WATERTUBE BOILER.



Simplest, lightest and most compact boiler made. Most accessible for cleaning and repair. Five vertical rows or as many as 45 tubes may be cleaned or withdrawn by removing the cover from a single hand hole. Largest grate surface on a given floor space. No joints in the fire All joints expanded. Greater steam room and water capacity than any other boiler. Built in sizes up to 2000 H. P. Mosher Boilers have been supplied for eleven torpedo boats and the monitor Florida of the U.S. Navy, amounting to over 26,000 H.P.; six torpedo boats for the Russian Navy, two gunboats for the Mexican government, one cruiser and one torpedo boat for the Brazilian government; the steam yachts Arrow, Ellide, Feiseen, Wauneta, Presto, and numerous other yachts and vessels.

SEND FOR DESCRIPTIVE CATALOGUE.

MOSHER WATERTUBE BOILER CO., No. 1 BROADWAY, N. Y.



250 STEAM VESSELS

Now Equipped With

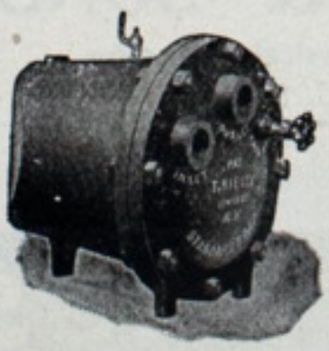
ALMY'S PATENT SECTIONAL Water Tube Boilers

Bear Evidence of Their

Excellent Qualities

Almy Water-Tube Boiler Co.

PROVIDENCE, R. I.



KIELEY

Standard Steam Trap

Made for Marine Work.

Also Reducing Valves, Steam Separators and expansion Traps for Marine Purpose.

SENT ON TRIAL

Good for any Pressure.

KIELEY & MUELLER

7-17 West Thirteenth St., New York WRITE FOR CATALOGUE.

Westinghouse Motors

Their successful record is the best guarantee.

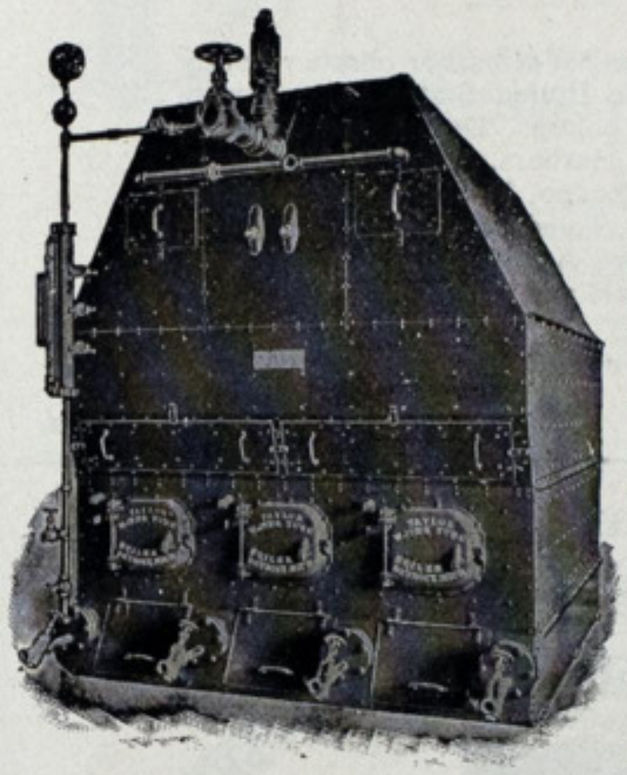
Particulars in
Alternating Current, Circulars 050, 1062, 1066.
Direct Current, Circulars 1042, 1068.

Westinghouse Electric & Mfg. Co.

Sales Offices in all Large Cities. Pittsburgh, Pa.

For Canada: Canadian Westinghouse Co., Limited, Hamilton, Ont.

Taylor Water Tube Boiler Co.



322 Franklin St.,
DETROIT, MICH.

Vertical Tubes, sectional, large steam space and liberating area.

Fire box, combustion chamber, and course for the furnace gases similar to the Scotch Marine.

Free circulation type.

Send for full description.

The MARTIN-BARRISS CO.

IMPORTERS AND MANUFACTURERS OF

MAHOGANY, WHITE MAHOGANY

AND ALL NATIVE CABINET WOODS

High Grades of Kiln Dried Woods for Cabin Work and Inside Trim.

White Oak Timbers and Plank

Constantly on Hand and Sawed to Order on Short Notice,

654 SENECA ST. CLEVELAND, O.

CRANE VALVES

ESTABLISHED 1855

Questions and Answers for Marine Engineers.

By Theo. Lucas.

Sent postpaid to any address for $2.00.

Marine Review, 39-41 Wade Bldg. Cleveland, O.

CHARLES E. PECK. WILLIAM A. PRIME.

CHAS. E. & W. F. PECK,

Insurance Brokers. Average Adjusters.

ESTABLISHED 1870.

NEW YORK, 58 William Street,
CHICAGO, 1115-16 Royal Insurance Bldg.
CLEVELAND, 1107-8 Williamson Bldg.

REPRESENTED BY
C. T. BOWRING & CO., (Insurance) LTD.,
5 and 6 Billiter Ave., LONDON,
and at "LLOYD'S" LONDON.

HULLS and CARGOES.

We place insurances in the most advantageous markets, employing, in the interest of our clients and with equal facility, all Foreign and Home companies, at the best procurable rates and terms.

We Represent Only the Assured.

NEW HARBOR CHARTS OF THE LAKES.

Following is a list of harbor charts recently issued from the United States Lake Survey Office, all in colors: Duluth and Superior Harbors, Two Harbors, Ashland, Marquette, Milwaukee, Chicago, Muskegon, Charlevoix, Michigan City, Toledo, Sandusky, Cleveland, Lorain, Fairport, Ashtabula, Conneaut, Erie, Dunkirk, Buffalo and Oswego.

For sale by THE MARINE REVIEW,

39-41 WADE BUILDING, CLEVELAND, O.

The Only Standard American Classification of Shipping.

RECORD OF AMERICAN AND FOREIGN SHIPPING.
ESTABLISHED 1867
PUBLISHED BY
American Bureau of Shipping, New York.

Has Authorized Agents in all the principal ports of the world to protect the interests of its patrons. Vessels built under its rules, or holding certificates of class in this Record of Shipping will, with their Cargoes, insure at lowest rates. Office, 66 Beaver Street, New York.

A. A. RAVEN, President. W. R. T. JONES, Vice President,
W. H. H. MOORE, Treasurer. W. IRVING COMES, Secretary.

The Donnelly Salvage and Wrecking Co., Ltd.,

JOHN DONNELLY, SR., Pres.
JOHN DONNELLY, JR., Vice-Pres.
H. B. FOLGER, Treas.
THOS. DONNELLY, Secy.

KINGSTON ONT.

DIVERS, STEAM PUMPS, TUGS, Etc.

SUPPLIED ON SHORTEST NOTICE.

INSURANCE

GEO. L. McCURDY

169 Jackson Boulevard
CHICAGO ILLINOIS

Direct Representative of Leading American and Foreign Underwriters

---

HULLS AND CARGOES

ESTABLISHED 1865.

THE FRANKFORT Marine, Accident and Plate Glass INSURANCE CO.

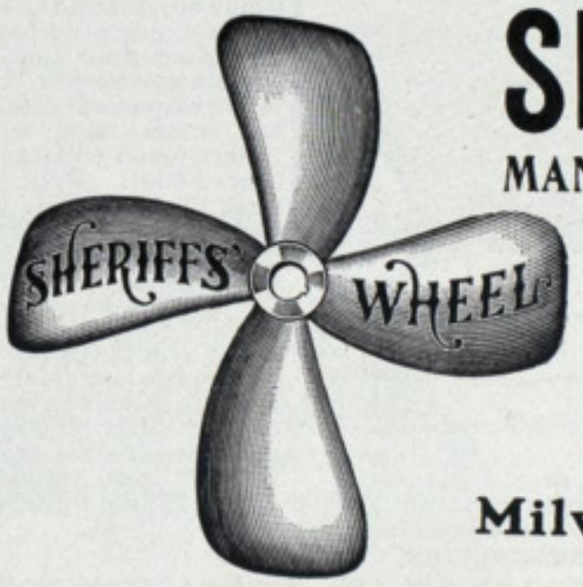
of FRANKFORT-ON-THE-MAIN, GERMANY.

Employers' Teams and Public Liability, Elevator Insurance, Workmen's Collective, Individual Accident.

For the security of Policyholders in the United States of America, a deposit has been made in the States of Massachusetts and New York of $400,000.00 in United States Bonds. UNITED STATES DEPARTMENT,
100 WILLIAM ST., NEW YORK, N. Y.

F. G. VOSS, Manager and Attorney.

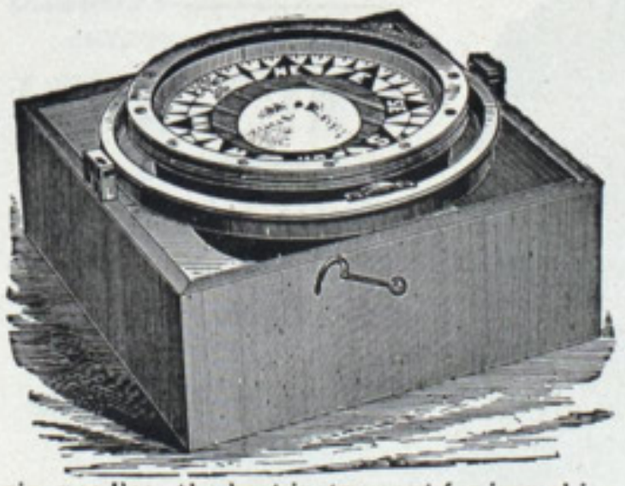
SHERIFFS MANUFACTURING CO.



Manufacturers of
PROPELLER WHEELS
Marine Engines and Repairs.

Milwaukee, Wis.
Phone S. 163

RITCHIE LIQUID COMPASS



The Standard Liquid Compass.
Used Exclusively by the United States Navy For Over 35 Years.
Over 25,000 Used in Merchant Service.

Made in all sizes and styles, from 2 to 12 inches diameter of card. All compasses made by us have our name printed below the North point, or prominently upon the card. NONE OTHER ARE GENUINE. Latest form with four or six needles, the best instrument for iron ships. For sale by ship chandlers and nautical instrument dealers.

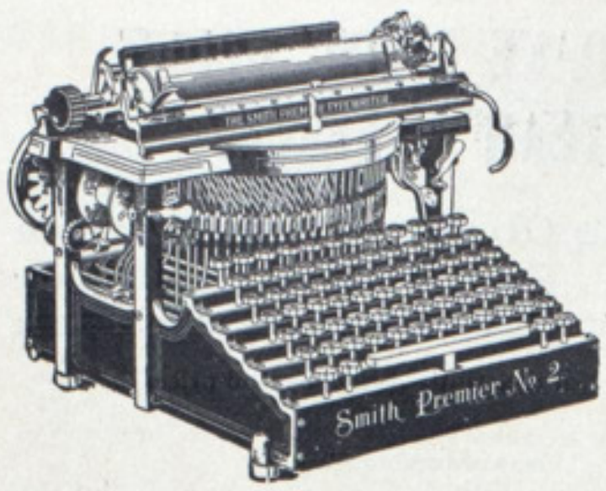
CATALOGUE FREE.

E. S. RITCHIE & SONS,

Manufacturers of Nautical and Physical Apparatus,
BROOKLINE, MASS., U. S. A.

CRANE FITTINGS

ESTABLISHED 1855



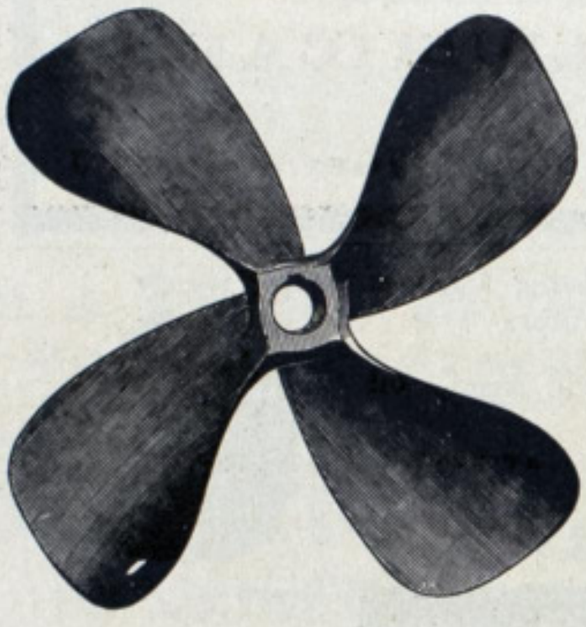
For practical work; for saving time; for long service and complete satisfaction, no other typewriter quite equals

The Smith Premier.

A little booklet explaining just why this is so will be sent on request
Better ask about it today.

THE SMITH PREMIER TYPEWRITER CO.,
158 Prospect St. - - - Clevelan , O.

Thirty Years' Experience building



Engines
and
Propeller Wheels.

H. G. TROUT,
King Iron Works,
226 Ohio St.,
BUFFALO, N. Y.

GEO. STRATFORD OAKUM CO.
JERSEY CITY, NEW JERSEY

Established 1860

Manufacturers of all grades of

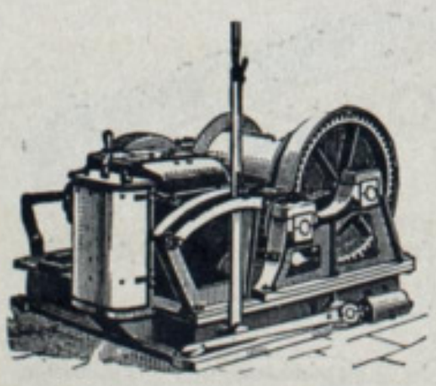
Oakum

Spun Cotton

FOR SALE AT SHIP CHANDLERS EVERYWHERE.

LIDGERWOOD HOISTING ENGINES. Over 22,000 in use.

ELECTRIC HOISTS Specialty adapted for Docks, Warehouses and Steamships.



Lidgerwood Electric Hoist.

Lidgerwood Miller Marine Cableway

will transfer Coal, Ammunition Supplies, etc., from ship to ship at sea.

SEND FOR CATALOGUE.

LIDGERWOOD MFG. CO.,
96 LIBERTY ST., NEW YORK.

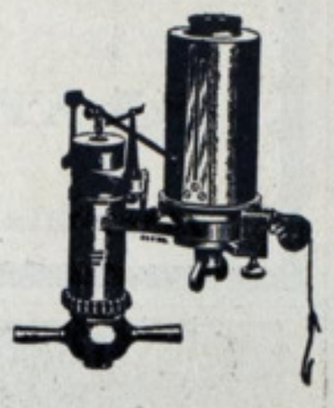
BLICKENSDERFER TYPEWRITERS.

No 7, $50.00

No 5, $35.00

BEST FOR ALL CLASSES OF WORK.

The Blickensderfer Mfg. Co., Stamford, Conn.



AMERICAN

THOMPSON IMPROVED INDICATOR with NEW DETENT MOTION.

DO NOT let this IMPROVEMENT ESCAPE YOUR ATTENTION.

SEND AT ONCE FOR CATALOG

INDICATORS THAT INDICATE
GAUGES THAT GAUGE
POPS THAT POP

AMERICAN STEAM GAUGE & VALVE MFG. CO.

NEW YORK. BOSTON. CHICAGO.

TEXT BOOK OF

NAVAL ARCHITECTURE,

BY J. J. WELCH.

$1.50.

MARINE REVIEW, - - CLEVELAND.

MARINE CHAIN

OF ALL KINDS.

Ships Cables, Dredge Chains,
Stud Link and Marine Railway Chains,
Steam Shovel Chains, Boom Chains, Etc.

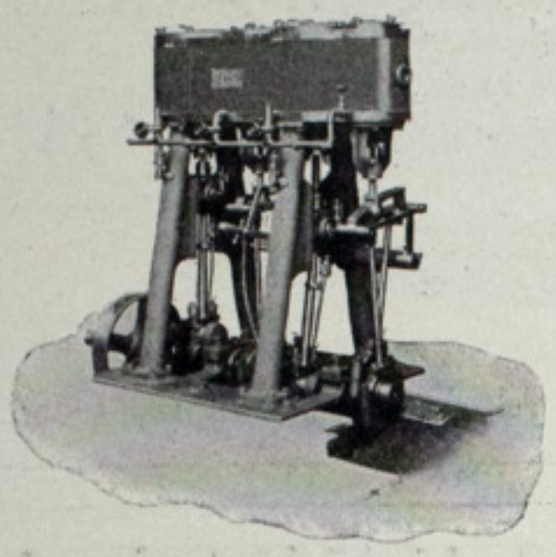
CERTIFICATE OF TEST FURNISHED.

STANDARD CHAIN CO.

PITTSBURGH, PA.

John E. Thropp & Sons Co.,

TRENTON, N. J.



Builders of Single, Compound, Triple-Expansion and Direct Connected Engines.

Boyer Sectional Water Tube boilers and machinery complete for light draft Passenger Boats, Yachts, Tugs, Etc.

Chas. Cory & Son,

Manufacturers of

Mechanical and Electrical Telegraphs and Indicators.

Engine Bells and Electric Call Bells.

278-279 Division St.

NEW YORK CITY.

A. J. MORSE & SON.

DIVING APPARATUS

140 CONGRESS ST. BOSTON.

ORAM FIX. ESTABLISHED 1860. J. W. FIX.

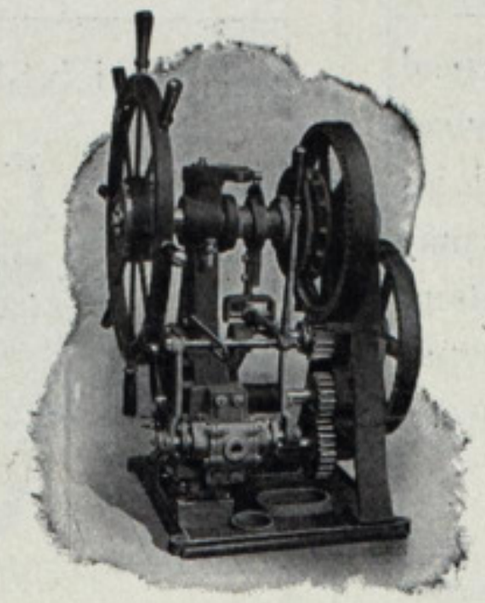
S. FIX'S SONS,

SUCCESSORS TO S. FIX & SON

Steam Flue Welding Works

Our Work Stands Government Test.
Our We'ds are Perfectly Smooth.
Write us for Prices.

COR. LEONARD AND WINTER STS. **Cleveland, O.**



THE DAKE PILOT HOUSE STEAM STEERER.

A Simple Compact and Durable Machine. Occupies Small Floor Space.

Write for descriptive circulars and prices,

MANUFACTURED BY

The Dake Engine Co.,

GRAND HAVEN, MICH.

OF VITAL INTEREST TO ENGINEERS.

There is a great amount of valuable information in the new and revised edition of DIXON'S

"GRAPHITE AS A LUBRICANT."

Write for a copy. 77-C.

Joseph Dixon Crucible Co., **Jersey City, N. J.**

WATER FILTERS REGULATORS & ENGINES

We make **Pressure Regulating Valves** for all purposes, steam or water.

Our **Feed-Water Filter** will keep oil out of your boiler.

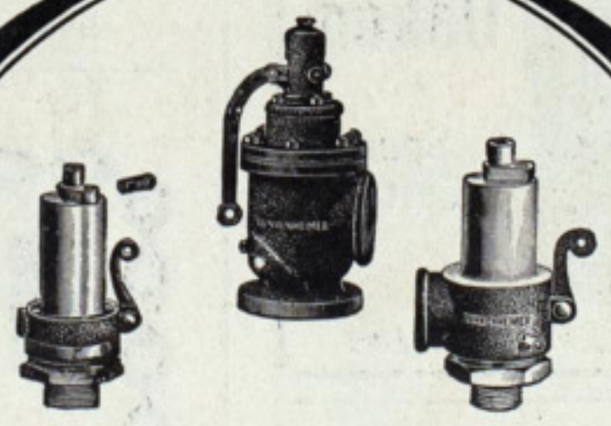
We can interest you if you use a condenser.

Water Engines for Pumping Organs

THE ROSS VALVE CO. TROY N. Y.

Keep Oil out of your Boiler with the
FEED-WATER FILTER
For Marine and Land Service
Two of these Filters are in use on the Oceanic.

LUNKENHEIMER



For Stationary Portable & Marine
STEAM BOILERS

Insure against boiler explosions by providing a Lunkenheimer Pop Safety Valve for your boiler. Lunkenheimer Valves are made of the very best materials and workmanship, have liberal springs, full relieving capacity, always prompt and reliable in operation. Subjected to rigid test and inspection and warranted to satisfy. Specify "*Lunkenheimer*" and order from your dealer. Write for catalog.

The Lunkenheimer Co.
Largest Manufacturers of Engineering Specialties in the World,
CINCINNATI, OHIO, U. S. A.

POP SAFETY VALVES

6

LEBANON PA.

Manufacturers of **HAND MADE CHAINS** of all grades.

SHIPS' CABLES, DREDGE CHAINS, CRANE CHAINS, BLOCK CHAINS.

Large chains furnished side or end welded. High grade tested chains a specialty.
We manufacture our own iron. We are licensed testers for Lloyds Association, American Bureau of Shipping and Bureau Veritas.

STEAMBOAT FUEL AT CHICAGO.

THE Y&L

Youghiogheny and Lehigh Coal Company.

J. T. CONNERY, Manager — ARCHIE J HITCHCOCK, Dock Sup't.

Main Office: 902-906 Fisher Bldg.,

277 DEARBORN STREET.

FUEL DOCKS.

No. 1, Michigan Slip and Basin, - - 'Phone Har. 4156.
No. 2, North Halsted Street Bridge, - 'Phone Har. 4157.
No. 3, Foot South Water St. and Illinois Central Slip C. 'Phone Har. 4158.

FUEL LIGHTER.

Equipped with 125 2-ton Buckets for Fueling Anywhere in Harbor.

Long Distance Telephone, Har. 4156.

Steamboat Fuel at Ashtabula.

Large Supplies of Best Quality.

Lighter Carrying Different Grades at all Times.

Fuel Scow with elevators and discharging spouts. Storage of 800 tons. Discharges 250 tons an hour into steamers while unloading cargo.

M. A. Hanna & Co., **Miners and Shippers,**

Main Office, Perry-Payne Bldg., Cleveland.

STEAMBOAT FUEL

at TOLEDO and HURON.

IRONVILLE DOCK & COAL CO.,

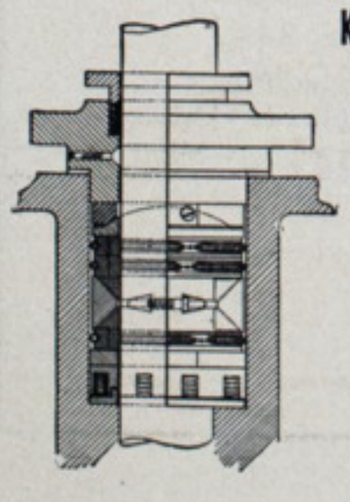
429 Spitzer Building, Toledo, Ohio.

Office, Main 1513. : : : Bell Phones : : : Dock, East 63.

Coal of Best Quality MASSILLON & PITTSBURG No. 8.

CLEVELAND CITY FORGE & IRON CO.

IRON OR STEEL FORGINGS FINISHED COMPLETE, ROUGH MACHINED OR SMOOTH FORGED ONLY, OF ANY WEIGHT. COUPLING LINKS AND PINS. PRESSED WROUGHT IRON TURNBUCKLES. CAR IRON SPECIALTIES.



Katzenstein's Self-Acting Metal Packing.

For PISTON RODS, VALVE STEMS, etc., of every description for Steam Engines, Pumps, etc., etc. Adopted and in use by the principal Iron Works and Steamship Companies in this and foreign countries. FLEXIBLE TUBULAR METALLIC PACKING, for slip-joints on Steam Pipes, and for Hydraulic Pressure; also METAL GASKETS for all kinds of flanges and joints. For full particulars and reference, address:

L. KATZENSTEIN & CO.,

General Machinists, Brass Finishers, Engineers' Supplies,

358 WEST ST., NEW YORK.

J. B. COWLE, Pres. — W. E. PERKINS, Sec'y and Treas

MAT. THOMAS, Gen'l Mgr.

The Union Machine & Boiler Company,

MACHINISTS, FOUNDERS AND BOILER MAKERS.

Jobbing solicited. Steel vessel repairs promptly attended to night or day.

108 TO 114 RIVER STREET. CLEVELAND, O.

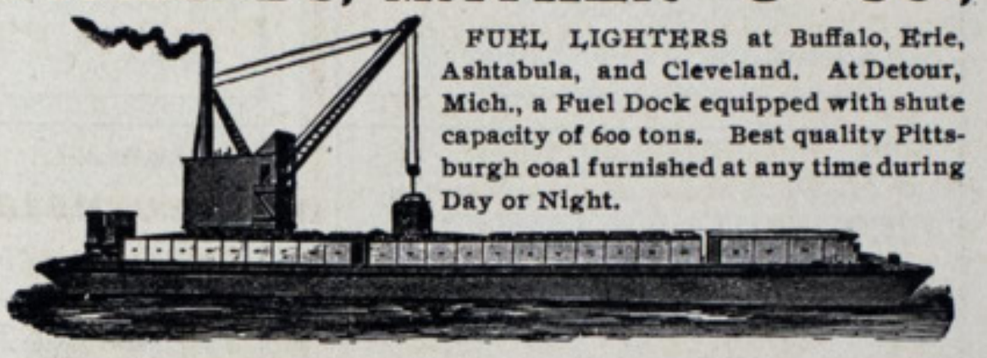
Phones: Bell Main 609. Cuy. A. 711. Night Call Cuy. M. 1843.

HOISTING ENGINES.

We build them in all sizes from new and improved designs, Every engine thoroughly tested before leaving our shop, and guaranteed to be satisfactory in every case. When in want of a hoist for marine work, dock work, mining, or any other purpose, kindly permit us to name you prices. We know we can please you.

MARINE IRON CO., - - - Bay City, Mich.

PICKANDS, MATHER & CO.,



FUEL LIGHTERS at Buffalo, Erie, Ashtabula, and Cleveland. At Detour, Mich., a Fuel Dock equipped with shute capacity of 600 tons. Best quality Pittsburgh coal furnished at any time during Day or Night.

Western Reserve Building, CLEVELAND, O.

HAWKINS' WORKS FOR ENGINEERS.

Most popular among young men in the engine departments of ships is **"Engineers' Examinations with Questions and Answers."** It sells at $2 and the same is the cost, delivered, of the following works:

Hawkins' New Catechism of Electricity.
Hawkins' Maxims and Instructions for the Boiler Room.
Hawkins' Hand Book of Calculations for Engineers.
Hawkins' New Catechism of the Steam Engine.

THE MARINE REVIEW, CLEVELAND, O.

De Grauw, Aymar & Company.

ESTABLISHED 1827.

Cordage, Oakum, Vessel and Railroad Supplies.

SOLE MANUFACTURERS IN THE UNITED STATES FOR

TYZACK'S STOCKLESS ANCHORS.

NEW YORK CITY.

BETTER and More ECONOMICAL than DRILLED BOLTS.

FALLS HOLLOW BOLTS are self-inspectors. Afford protection against explosions. Are of uniform strength and flexibility. Hole is central, admits air, which aids combustion. Superior quality guaranteed. Samples of either Hollow or Solid furnished on application. Ask for our latest price list.

VESSEL AND INSURANCE AGENTS.

T. R. McCARTHY,
Steamship and Freight Broker;
Chartering, Forwarding and General Commission Agent; and Broker for the Sale, Purchase and Construction of Steamers and Sailing Vessels.
Marine and Fire Insurance Effected.
Cable Address, "Maccarthy, Montreal"
(Watkins', Scott's Liebers and A. B. C. Codes Used.)
Shipping Agents to The Asbestos & Asbestic Co., Ltd., of Danville, Que. and The Belgo Pulp & Paper Co., Shawinigan Falls Que.
404 Board of Trade Bldg., MONTREAL, CAN.
Correspondence Invited and Agencies Solicited.

S. S. LESTER,
Steamship Agent and Freight Broker.
Manager Steamer
ST. LAWRENCE,
83 Dalhousie St. QUEBEC, QUE.

Insurance.
PRINDIVILLE & COMPANY,
Average Adjusters.
Insurance Brokers.
12 Sherman Street,
CHICAGO.
Representing:
Johnson & Higgins, New York.
Represented by:
Willis Faber & Co., Ltd., London.
Jno. D. Tyson & Co, Liverpool.

P. H. FLEMING & CO.
Insurance and Vessel Agents.
Marine, Fire, Ocean, Liability.
Telephone, Harrison 1359.
No. 2 Sherman St., CHICAGO, ILL.

C. W. Elphicke. J. J. Rardon. M. C. Reuter.
C. W. ELPHICKE & CO.
Vessel and Insurance Agents.
No. 6 Sherman St., CHICAGO, ILL.
Telephone, Harrison 1194.

D. Sullivan. F. J. Sullivan.
D. SULLIVAN & CO.
Vessel Agents.
Marine Insurance.
2-4 Sherman St., CHICAGO, ILL.
Office Tel., Harrison 2847. Res. Ashland 2483.

W. A. Hawgood. Arthur H. Hawgood.
W. A. HAWGOOD & CO.
Vessel and Insurance Agents.
220-21 Perry-Payne Bldg. Cleveland, O.
Telephones. { Office, Main 2395. Res. W. A. Hawgood, Doan 84-J. Res. A. H. Hawgood Doan 841-J.

J. Mitchell. J. F. Wedow. A. Mitchell.
MITCHELL & CO.
Vessel and Insurance Agents.
508-10 Perry-Payne Bldg., Cleveland, O.
Office Tel. M.767. Res. John Mitchell, Doan 341.
John F. Wedow, Doan 141-J.
Alfred Mitchell, Doan 218

VESSEL AND INSURANCE AGENTS.

C. L. Hutchinson. W. H. McGean.
HUTCHINSON & CO.
Vessel and Insurance Agents.
Phones: { Office, Main 2453. Res. C. L. Hutchinson, Ridge 345 L. Res. W. H. McGean, East 1421-J.
313-15 Perry-Payne Bldg., Cleveland, O.

W. C. RICHARDSON,
Vessel Owner and Broker and Marine Insurance Agent.
420-421 Perry Payne Building,
CLEVELAND, O.
Office Tel., 338. Residence Tel., 2938.

C. P. GILCHRIST & CO.
Vessel and Insurance Agents.
Sale and Exchange of Vessels a Specialty.
Lumber and Coal Chartering.
Full Telephone Service, Office and Residence.
(Local and Long Distance.)
411 Perry-Payne Bldg., Cleveland, O.

John B. Hall. Harry B. Root.
HALL & ROOT,
Vessel Agents.
21-22 Exchange Bldg., 202 Main St.,
Telephone Seneca 892. BUFFALO, N. Y.

JOHN J. BOLAND,
Vessel and Insurance Agent.
25-26 Exchange Bldg., 202 Main St.,
Telephone, Seneca 115. BUFFALO, N. Y.

PARKER BROS. CO., LTD.,
Vessel, Marine Insurance and Wrecking Agents Marine Surveyors
Office Tel. Main 5314. Night: Main 290.
Night: Grand 1723 J.
15 Atwater St. West, DETROIT, MICH.

D. T. HELM & CO.
Vessel and Insurance Agents.
Telephones—Office 263
Res. 381-3.
DULUTH, - - - MINN.

SAMUEL HOLMES,
Steamship Offices,
For Selling, Chartering and Building all Classes Steam Vessels
Steam Vessel Circulars
Weekly Freight Circulars
Morris Bldg, 66-8 Broad St., New York.

F. H. WEEKS,
Marine Broker.
Vessels Sold, Chartered Built and Insured.
Cable Address, WEEKSHIP, New York.
Telephone, 3275 Broad.
32 Broadway, NEW YORK.

Charles P. Notman. David H. E. Jones.
JAMES W. ELWELL & CO.
Established 1830.
Ship Brokers and Steamship Agents.
Sell and Charter All Classes of Vessels
Agents for Cyprien Fabre & Cie. S.S. Line, Cie. Havraise Peninsulaire and Northwestern S. S. Co.
21-24 State Street, NEW YORK.

PROCTORS IN ADMIRALTY.

WILLIAM H. FAUST,
Lieutenant United States Navy, (ret.)
Counselor and Proctor in Admiralty.
Room 344 Federal Building,
BUFFALO, N. Y.

C. E. KREMER,
Counselor at Law and Proctor in Admiralty.
Suite 821-822 New York Life Bldg.,
CHICAGO, ILL.

HOYT, DUSTIN & KELLEY,
Lawyers and Proctors in Admiralty.
Offices, 702 Western Reserve Building,
CLEVELAND, O.

WHITE, JOHNSON, McCASLIN & CANNON,
Attorneys-at-Law and Proctors in Admiralty.
Williamson Bldg, CLEVELAND, O.

GOULDER, HOLDING & MASTEN,
Law Offices.
H. D. Goulder. S. H. Holding. F. S. Masten.
Perry Payne Building,
CLEVELAND, O.

ALBERT J. GILCHRIST,
Proctor in Admiralty.
604 Perry Payne Building,
CLEVELAND, O.

HAND BOOK
OF
ADMIRALTY LAW,
by
ROBT. M. HUGHES,
Price, $3.75
THE PENTON PUB. CO.,
Cleveland, O.

MARINE INSURANCE,
by
WILLIAM GOW.
Price, $1.50
THE PENTON PUB. CO.,
Cleveland, O.

PROCTORS IN ADMIRALTY.

Geo. S. Potter. Meredith Potter.

POTTER & POTTER,

Lawyers and Proctors in Admiralty.

35-36 Dun Building, 110 Pearl Street,
BUFFALO, N. Y.

RAY G. MacDONALD,

Attorney-at-Law and Proctor in Admiralty.

630 First National Bank Building,
Telephone, Central 3507
Automatic 8085 CHICAGO, ILL.

SHAW, WARREN, CADY & OAKES,

Attorneys-at-Law.

904 to 907 Union Trust Building,
Telephone, 625. DETROIT, MICH.

NAVAL ARCHITECTURE,

by

THOS. H. WATSON.

A manual on laying off iron and steel vessels. Valuable for naval architects as well as beginners in ship yards.

Price, $5.00

Order from

THE PENTON PUB. CO.,
Cleveland, O.

COMPASS ADJUSTER.

CAPT. J. M. FIELDS

INVENTOR OF AND AGENT FOR

Field's Patent Course Finder.

The Bethel, - CLEVELAND, O.

PROFESSIONAL.

W. J. WOOD,

Naval Architect, Consulting Engineer.

Prepares designs or working drawings and specifications for all classes of vessels and superintends construction and repairs Surveys damaged property and estimates cost of repairs. Arbitrator and court expert.

FIRE BOATS A SPECIALTY.

Complete Plans furnished for Steel, Composite or Wooden Vessels.

709 Rialto Building, CHICAGO.

Tel. Harrison 1020.

HENRY RICE and
H. O. LOVEJOY,

Naval Architects.
Consulting Engineers.

Surveyors of Wood and Steel Ships, Engines and Boilers. Estimates of cost given. Superintendence of building and repairing. Plans and specifications furnished for all classes of ships.

Lines and models furnished.

Room 18,
202 Main Street., BUFFALO, N. Y.

JOSEPH KIDD,

Marine Architect and Surveyor.

Consulting Ship Builder and Engineer

Over thirty years' experience. Specifications, designs and estimates. Superintendence of construction and repairs. Damage and other surveys carefully attended to. Negotiations for the building, charter or sale of all kinds of vessels and machinery.

610 Board of Trade,

DULUTH, MINN.

ROBERT W. HUNT & CO.,

Bureau of Inspection.
Tests and Consultation.

1121 The Rookery, CHICAGO.

Monong. Bank Bldg., PITTSBURG.

66 Broadway, NEW YORK.

Inspectors of shipbuilding material and machinery. Inspectors of all materials. Duty tests of engines and boilers. Physical and chemical laboratories.

AMBROSE V. POWELL,

Member American Society Civil Engineers

Civil Engineer

Designs and Constructs Dry Docks, Harbor Works, Docks, and Plant for Handling Coal and Ore, Foundations

Office, 1008 Chamber of Commerce,
CHICAGO, ILL.

PROFESSIONAL.

H. Matteson, Jr. Geo. B. Drake.

MATTESON & DRAKE,

Naval Architects and Consulting Engineers.

Designing and Superintendence of building and repairing steel and wooden vessels.

Bulk oil vessels a specialty.

Agents for marine specialties.

706-707 Bourse, PHILADELPHIA.

ADAM STEEL, JAS. NACEY,
ALEXANDER HYND,

Marine Architects.
Mechanical Draughtsmen.
Consulting Engineers.

Specifications and designs for all descriptions of marine vessels, engines and boilers. Supervision of construction and repairs. Damage and other surveys carefully attended to.

208-9 Western Reserve Building,
CLEVELAND, O.

Phone, Main 3339 J.

PITTSBURGH TESTING LABORATORY, Ltd.,

Inspecting and Metallurgical Engineers and Chemists.

Inspectors of shipbuilding materials and machinery. Inspectors located at all mills. Physical and chemical laboratories. Tests of all kinds.

1750 Monadnock, CHICAGO.
235 Water Street, PITTSBURG.

906-7 Crozier Building, Philadelphia,
New York City, 60 New Street,
Richmond, Va., 1107½ Main Street.

Members Maritime Association Port of N. Y.

SADLER, PERKINS & FIELD,

Naval Architects and Engineers.
Chartering and Brokerage.
Maritime Bldg., New York.
NEW YORK. DETROIT.

NAVAL ARCHITECTS' AND ENGINEERS' DATA BOOK,

By T. H. WATSON.

Price, $1.50

THE PENTON PUB. CO.,
Cleveland, O.

PATENTS.

Buyers' Directory of the Marine Trade.

For a more complete classification than that represented by advertisers in the Marine Review, see the BLUE BOOK OF AMERICAN SHIPPING, marine and naval directory of the United States, published by the Marine Review, 39-41 Wade Bldg., Cleveland.

See accompanying index of Advertisers for full addresses of concerns in this directory.

AIR COMPRESSORS, AIR HOISTS, ETC.

Dake Engine Co.....Grand Haven, Mich.
Great Lakes Engineering Works.....Detroit.
Mietz, Aug.....New York

AIR PORTS, DEAD LIGHTS, ETC.

Marine Mfg. & Supply Co.....New York.

AIR PUMPS AND APPLIANCES.

Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.

ANCHORS.

Baldt Anchor Co.....Chester, Pa.
Bowers, L. M. & Co.....Binghamton, N. Y.
DeGrauw, Aymar & Co.....New York.
Seaboard Steel Casting Co.....Chester, Pa.

ANTI-FRICTION METALS.

Cramp, Wm. & Sons.....Philadelphia.
Phosphor Bronze Smelting Co., Ltd...Philadelphia.
Victor Metals Co.....Braintree, Mass.

ARTIFICIAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Sturtevant, B. F., & Co.....Boston.

ASBESTO-METALLIC PACKING.

American Steam Packing Co.....Boston.

ASH EJECTORS.

Great Lakes Engineering Works.....Detroit.

ATTORNEYS AND PROCTORS IN ADMIRALTY.

Faust, Lieut. Wm. H.....Buffalo.
Gilchrist, Albert J.....Cleveland.
Goulder, Holding & Masten.....Cleveland.
Hoyt, Dustin & Kelley.....Cleveland.
Kremer, C. E.....Chicago.
MacDonald, Ray G.....Chicago.
Potter & Potter.....Buffalo
Shaw, Warren, Cady & Oakes.....Detroit.
White, Johnson, McCaslin & Cannon.....Cleveland.

BAROMETERS, MARINE GLASSES, ETC.

Ritchie, E. S. & Sons.....Brookline, Mass.

BELTING, RUBBER.

New York Belting & Packing Co.....New York.

BLOCKS, SHEAVES, ETC.

Boston & Lockport Block Co.....Boston, Mass.
Cleveland Block Co.....Cleveland.

BLOWERS.

Sturtevant, B. F. Co.....Boston.

BOAT BUILDERS.

Drein, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, David.....New York.
Lane & DeGroot.....Long Island City, N. Y.
Marine Construction & D. D. Co.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Willard, Chas. P. & Co.....Chicago.

BOILER MANUFACTURERS.

Almy Water Tube Boiler Co.....Providence, R. I.
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Babcock & Wilcox Co.....New York.
Chicago Ship Building Co.....Chicago.
Cramp, Wm. & Sons.....Philadelphia.
Delauney, Belleville & Co.....St. Denis, France.
Detroit Ship Building Co.....Detroit.
Fletcher, W. A. & Co.....Hoboken, N. J.
Fore River Ship & Engine Co.....Quincy, Mass.
Forest City Boiler Co.....Cleveland.
Georgian Bay Engineering Works.....Midland, Ont.
Gogebic Steam Boiler Works.....Duluth, Minn.

BOILER MANUFACTURERS.—Continued.

Great Lakes Engineering Works.....Detroit.
Jenks Ship Building Co.....Port Huron, Mich.
Kingsford Foundry & Machine Works.Oswego, N. Y.
Milwaukee Dry Dock Co.....Milwaukee.
Mosher Water Tube Boiler Co.....New York.
Newport News Ship Building Co.Newport News, Va.
Northwestern Steam Boiler & Mfg. Co.Duluth, Minn.
Risdon Iron Works.....San Francisco.
Roberts Safety Water Tube Boiler Co...New York.
Stirling, The Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.
Taylor Water Tube Boiler Co.....Detroit.
Union Machine & Boiler Co.....Cleveland.
United States Ship Building Co.....New York.
Willard, Chas. P. & Co.....Chicago.

BOILER COMPOUNDS.

Dearborn Drug & Chemical Works.....Chicago.

BOILER RIVETS.

Bourne-Fuller Co.....Cleveland.

BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

BOILER TUBES

Bourne-Fuller Co.....Cleveland.

BOOKS, NAUTICAL AND ENGINEERING.

Marine Review Pub. Co.....Cleveland.

BRASS AND BRONZE CASTINGS.

Cramp, Wm. & Sons.....Philadelphia.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Lunkenheimer Co.....Cincinnati
Macbeth Iron Co.....Cleveland.
Phosphor Bronze Smelting Co.....Philadelphia.
Victor Metals Co.....Braintree, Mass.

BRIDGES, BUILDERS OF.

Scherzer Rolling Lift Bridge Co.....Chicago.

BUCKETS, ORE AND COAL.

Brown Hoisting & Conveying Machine Co.Cleveland.
Macbeth Iron Co.....Cleveland.

CABIN AND CABINET FINISHING WOODS.

Martin-Barriss Co.....Cleveland.

CAPSTANS.

American Ship Windlass Co.....Providence, R. I.
Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....New York.

CARPETS, FURNITURE, BEDS, ETC.

Meckes, John.....Cleveland
Siegel, Cooper Co.....New York.
Sterling & Welch Co.....Cleveland.

CEMENT, IRON FOR REPAIRING LEAKS.

Smooth-On Mfg. Co.....Jersey City, N. J.

CHAINS.

Lebanon Chain Works.....Lebanon, Pa.
Standard Chain Co.....Pittsburg.

CHAIN HOISTS.

Boston & Lockport Block Co.....Boston, Mass.
Dake Engine Co.....Grand Haven, Mich.

CHARTS.

Marine Review Pub. Co.....Cleveland.
Potter, J. D.....London.

CLOCKS (Marine and Ship's Bell) AND CHRONOMETERS.

Ashton Valve Co.....Boston.
Chelsea Clock Co.....Boston.
Ritchie, E. S. & Sons.....Brookline, Mass.
Standard Gauge Mnfg. Co.....Syracuse, N. Y.

COAL PRODUCERS AND SHIPPERS.

Hanna, M. A. & Co.....Cleveland
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.

COAL AND ORE HANDLING MACHINERY.

Brown Hoisting Machinery Co (Inc.)....Cleveland.
Lidgerwood Mfg. Co.....New York.
Macbeth Iron Co.....Cleveland.

COMPASS ADJUSTERS.

Fields, Capt. J. M.....Cleveland.

COMPASSES.

Ritchie, E. S. & Sons.....Brookline, Mass.

CONCRETE MIXERS.

Contractors Supply & Equipment Co.....Chicago.

CONDENSERS.

Great Lakes Engineering Works.....Detroit.
Thropp & Sons Co., John E.....Trenton, N. J.

CONTRACTORS' SUPPLIES.

Contractors Supply & Equipment Co.....Chicago.

CONTRACTORS FOR PUBLIC WORKS.

Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co....Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Hickler Bros.....Sault Ste. Marie Mich.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H.....Milwaukee.

CORDAGE.

Baker & Co., H. H.....Buffalo.
DeGrauw, Aymar & Co.....New York.
Upson-Walton Co.....Cleveland.

CORK JACKETS AND RINGS.

Armstrong Cork Co.....Pittsburg, Pa.
Kahnweiler's Sons, D.....New York.
Lane & DeGroot.....Long Island City, N. Y.

COURSE FINDER.

Fields' Patent Course Finder.....Cleveland.

CHAIN CONVEYORS, HOISTS.

Brown Hoisting Machinery Co (Inc.).....Cleveland.
General Electric Co.....Schenectady, N. Y.
Lidgerwood Mfg. Co.....New York.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

CRANES, TRAVELING.

Brown Hoisting Machinery Co.....Cleveland.
Lidgerwood Mfg. Co.....New York.
Pawling & Harnischfeger.....Milwaukee.

DIVING APPARATUS.

Morse, A. J. & Son.....Boston.
Schrader's Son, A.....New York.

DREDGING CONTRACTORS.

Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co....Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Hickler Bros.....Sault Ste. Marie, Mich.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H.....Milwaukee.

DRYING APPARATUS.

Bayley & Sons Co, Wm.....Milwaukee, Wis.
Sturtevant, B. F. Co.....Boston.

DRY DOCKS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Buffalo Dry Dock Co.....Buffalo.
Chicago Ship Building Co.....Chicago.
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.Newport News, Va.
Shipowners Dry Dock Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.
United States Ship Building Co.....New York.

Buyers' Directory of the Marine Trade.—*Continued.*

ELECTRIC HOISTS AND CRANES.

General Electric Co.....Schenectady, N. Y.
Lidgerwood Mfg. Co.....New York.
Pawling & Harnischfeger.....Milwaukee.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

ELECTRIC LIGHT AND POWER PLANTS.

Bayley & Sons Co., Wm. ..... Milwaukee, Wis.
General Electric Co.....Schenectady, N. Y.
Mietz, Aug..... New York.
Sturtevant, B. F. Co.....Boston.
Thropp & Sons, John E .....Trenton, N. J.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

ENGINE BUILDERS, MARINE.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Chicago Ship Building Co.....Chicago.
Chase Machine Co. .....Cleveland.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Dake Engine Co.....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit, Mich.
Hall Bros .....Philadelphia.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Mietz, Aug,..... ....New York.
Milwaukee Dry Dock Co.....Milwaukee.
Mosher, Chas. D.....New York.
Moulton Steering Engine Co.....New York.
Newport News Ship Building Co. Newport News, Va.
Northwestern Steam Boiler & Mfg. Co. Duluth, Minn.
Risdon Iron Works.....San Francisco.
Roach's Ship Yard.....Chester, Pa.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co.....Superior, Wis.
Thropp, J. E. & Sons Co.....Trenton, N. J.
Trout, H. G.....Buffalo.
United States Ship Building Co.....New York.
Willard, Chas. P. & Co.....Chicago.

ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.

Cory, Chas. & Son.....New York.
Marine Mfg. & Supply Co..... ...New York.

ENGINEERING SPECIALTIES AND SUPPLIES.

Crane Co..... Chicago.
Kieley & Mueller .....New York.
Lunkenheimer Co. .....Cincinnati.
Mooers & Co., H.....Milwaukee
New York Belting & Packing Co.....New York.
Northwestern Steam Boiler & Mfg. Co. Duluth, Minn.

ENGINEERS, MARINE, MECHANICAL, CONSULTING.

Hynd, Alexander .....Cleveland.
Hunt, Robt. W. & Co.....Chicago.
Kidd, Joseph .....Duluth, Minn.
Lovejoy, H. O. .....Buffalo.
Matteson & Drake .....Philadelphia.
Mosher, Chas. D.....New York.
Nacey, James .....Cleveland.
Pittsburg Testing Laboratory, Ltd.....Pittsburg.
Rice, Henry .....Buffalo.
Roelker, H. B.....New York.
Sadler, Perkins & Field .....New York.
Steel, Adam .....Cleveland.
Wood, W. J. .....Chicago.

FANS FOR VENTILATION, EXHAUST, ETC.

Sturtevant, B. F. Co.....Boston.

FEED WATER PURIFIERS AND HEATERS.

Learmonth, Robert .....Buffalo.
Ross Valve Co.....Troy, N. Y.

FIXTURES FOR LAMPS, OIL OR ELECTRIC.

General Electric Co.....Schenectady, N. Y
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

FORGES.

Sturtevant, B. F. Co.....Boston.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co.....Cleveland
Fore River Ship & Engine Co.....Quincy, Mass
Macbeth Iron Co.....Cleveland

FLUE WELDING.

Fix's, S. Sons .....Cleveland.

FURNACES FOR BOILERS.

Continental Iron Works .....New York.

FUELING COMPANIES AND COAL DEALERS.

Hanna, M. A. & Co.....Cleveland.
Ironville Dock & Coal Co.....Toledo, O.
Parker Bros. Co., Ltd.....Detroit.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Smith, Stanley B., & Co.....Detroit.
Smith Coal & Dock Co., Stanley B.....Toledo, O.
Youghiogheny & Lehigh Valley Coal Co....Chicago.

GASKETS, RUBBER.

New York Belting & Packing Co.....New York.

GAS BUOYS.

Safety Car Heating & Lighting Co.....New York.

GAS AND GASOLINE ENGINES.

Chase Machine Co.....Cleveland.
Georgian Bay Engineering Works .....Midland, Ont.
Temple Pump Co..... Chicago.

GAUGES, STEAM AND VACUUM.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.
Lunkenheimer Co. .....Cincinnati.
Standard Gauge Mfg. Co ..... Syracuse, N. Y.

GAUGES, WATER.

Bonner & Co., Wm. T.....Boston
Lunkenheimer Co..... Cincinnati, O.
Standard Gauge Mnfg. Co..... Syracuse, N. Y.

GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

HAMMERS, STEAM.

Chase Machine Co.....Cleveland.

HEATING APPARATUS.

Bayley & Sons Co., Wm. .....Milwaukee, Wis.
Sturtevant, B. F. Co.....Boston.

HOISTS FOR CARGO, ETC.

American Ship Building Co.....Cleveland.
Brown Hoisting Machinery Co. (Inc.)....Cleveland.
Chase Machine Co.....Cleveland.
Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....New York.
Georgian Bay Engineering Works .... Midland, Ont
Hyde Windlass Co.....Bath, Me.
Lidgerwood Mfg. Co.....New York.
Marine Iron Co .....Bay City.
Mietz Aug.....New York.
Pawling & Harnischfeger.....Milwaukee.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

HOSE, RUBBER.

New York Belting & Packing Co.....New York.

HYDRAULIC DREDGES.

Great Lakes Engineering Works.....Detroit.

HYDRAULIC TOOLS.

Watson-Stillman Co., The.....New York.

ICE MACHINERY.

Great Lakes Engineering Works.....Detroit.
Roelker, H. B.....New York.

INDICATORS FOR STEAM ENGINES.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.

INJECTORS.

American Injector Co.....Detroit.
Crane Co.....Chicago.
Jenkins Bros. .....New York.
Lunkenheimer Co.....Cincinnati.
Penberthy Injector Co.....Detroit, Mich.

INSURANCE, MARINE.

Elphicke, C. W. & Co.....Chicago.
Fleming & Co., P. H.....Chicago.
Frankfort Marine, A. & P. G. Ins. Co....New York.
Gilchrist & Co., C. P.....Cleveland.
Hawgood & Co., W. A.....Cleveland.
Helm & Co., D. T.....Duluth.
Hutchinson & Co.....Cleveland.
McCarthy, T. R.....Montreal.
McCurdy, Geo. L.....Chicago.
Mitchell & Co.....Cleveland.
Parker Bros. Co., Ltd..... .....Detroit.
Peck, Chas. E. & W. F.....New York and Chicago.
Prindiville & Co.....Chicago.

INSURANCE, MARINE.—Continued.

Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.
Voss, F. D.....New York.
Weeks, F. H.....New York.

IRON ORE AND PIG IRON.

Bourne-Fuller Co.....Cleveland.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Georgian Bay Engineering Works.....Midland, Ont.
Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Willard, Chas. P.....Chicago.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong Cork Co. .....Pittsburg.
Carley Life Float Co.....New York.
Drein, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, D.....New York.
Lane & DeGroot.....Long Island City, N. Y.

LIGHTS, SIDE AND SIGNAL.

Russell & Watson .....Buffalo.

LOGS.

Walker & Sons, Thomas.....Birmingham, Eng.
Also Ship Chandlers.

LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

LUBRICATORS.

Crane Co. .....Chicago.
Lunkenheimer Co. .....Cincinnati.

LUMBER.

Martin-Barriss Co .....Cleveland.
Shurick, F. S. .....New York.

MACHINISTS.

Chase Machine Co.....Cleveland.
Gogebic Steam Boiler Works.....Duluth, Minn.
Hickler Bros.... .....Sault Ste. Marie, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Mooers & Co., H.....Milwaukee.
Union Machine & Boiler Co.....Cleveland.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc.....Philadelphia.

MARINE RAILWAYS.

Hickler Bros.....Sault Ste. Marie, Mich.

MARINE GLUE.

Ferdinand & Co., L. W.....Boston, Mass

MARINE RAILWAYS, BUILDERS OF.

Crandall & Son, H. I.....East Boston, Mass

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W.....New York.
Meckes John..... .....Cleveland
Siegel Cooper Co.....New York.
Sterling & Welch Co. ....Cleveland.

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works. ..... Detroit.
Sturtevant, B. F. Co.....Boston.

MELTING POT AND PAYING LADLE.

(For Paying Seams of Decks with Marine Glue.)
Ferdinand & Co., L. W. . . ..Boston

METALLIC PACKING.

Katzenstein, L. & Co.....New York.
U. S. Metallic Packing Co.....Philadelphia.

METAL POLISH.

Bertram's Oil Polish Co.....Boston.

MOTORS, GENERATORS—ELECTRIC.

General Electric Co.....Schenectady, N. Y.
Bayley & Sons Co., Wm. ..... Milwaukee, Wis.
Sturtevant, B. F. Co.....Boston.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

NAUTICAL INSTRUMENTS.

Ritchie, E. S. & Sons..... .....Brookline, Mass.

Buyers' Directory of the Marine Trade.—*Continued.*

NAVAL ARCHITECTS.

Hynd, Alexander .....Cleveland.
Kidd, Joseph .....Duluth, Minn.
Lovejoy, H. O. .....Buffalo.
Matteson & Drake .....Philadelphia.
Mosher, Chas. D.....New York.
Nacey, James .....Cleveland.
Rice, Henry .....Buffalo.
Sadler, Perkins & Field.....New York.
Steel, Adam .....Cleveland.
Wood, W. J.....Chicago.

OAKUM.

DeGrauw, Aymar & Co.....New York.
Stratford Oakum Co .....Jersey City, N. J.

OIL FOR PAINTING.

Sipe & Co., James B.....Allegheny, Pa.

OIL ENGINES.

Mietz, Augo..... New York

OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph.....Jersey City, N. J.
Standard Oil Co.....Cleveland

PACKING.

American Steam Packing Co.....Boston.
Crane Co. .....Chicago.
Jenkins Bros. .....New York.
Katzenstein, L. & Co.....New York.
New York Belting & Packing Co.....New York.
United States Metallic Packing Co....Philadelphia.

PACKING TOOL.

Matteson & Drake ..... Philadelphia.

PAINTS.

Baker, Howard H. & Co.....Buffalo.
Detroit Varnish Co.....Detroit.
Detroit White Lead Works.....Detroit.
Forest City Paint and Varnish Co ..... Cleveland.
New Jersey Zinc Co.....New York.
Sipe & Co., James B.....Allegheny, Pa.
Upson-Walton Co. .....Cleveland.

PATTERN SHOP MACHINERY.

Atlantic Works, Inc.....Philadelphia.

PILE DRIVING AND SUBMARINE WORK.

Buffalo Dredging Co .....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co...Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simon & Connell Co.....Chicago.
Hickler Bros.. ..... Sault Ste. Marie, Mich.
Parker Bros. Co., Ltd..... .....Detroit.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H.....Milwaukee.

PIPE, WROUGHT IRON.

Bourne-Fuller Co.....Cleveland.
Crane Co. .....Chicago.
Macbeth Iron Co. .....Cleveland.

PLANING MILL MACHINERY.

Atlantic Works, Inc.....Philadelphia.

PLATES—SHIP, STRUCTURAL, ETC.

Bourne-Fuller Co. .....Cleveland.
Otis Steel Co..... .....Cleveland.

PNEUMATIC TOOLS.

Allen, John F.....New York.

POLISH FOR METALS.

Bertram's Oil Polish Co.....Boston.

PRESSURE REGULATORS.

Kieley & Mueller .....New York.
Ross Valve Co.....Troy, N. Y.

PROPELLER WHEELS.

American Ship Building Co.....Cleveland.
Atlantic Works .....East Boston, Mass.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.Newport News, Va.
Phosphor Bronze Smelting Co., Ltd.....Philadelphia.
Risdon Iron Works .....San Francisco.
Roelker, H. B.....New York.
Sheriffs Mfg. Co.....Milwaukee.
Superior Shipbuilding Co.....Superior, Wis.
Thropp & Sons Co., J. E.....Trenton, N. J.
Trout, H. G.....Buffalo.
United States Ship Building Co.....New York.

PROJECTORS, ELECTRIC.

General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F., Mfg. Co.....New York.
Great Lakes Engineering Works.....Detroit.
Kingsford Foundry & Machine Wks..Oswego, N. Y.
Temple Pump Co..... ..Chicago.

PUNCHES, RIVETERS, SHEARS.

Allen, John F.....New York.

RANGES.

Russell & Watson .....Buffalo.

REFRIGERATING APPARATUS.

Great Lakes Engineering Works.....Detroit.
Roelker, H. B.....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register .....Cleveland.
Record of American & Foreign Shipping..New York.

REPAIRS—ENGINE AND BOILER.

(See also Boiler Manufacturers and Engine Builders.)

Georgian Bay Engineering Works ... Midland, Ont.
Gogebic Steam Boiler Works.. ..... Duluth, Minn.
Marine Iron Co..... ... Duluth, Minn.
Forest City Boiler Co.....Cleveland.

RIVETING MACHINES.

Allen, John F.....New York.

RIVETS, STEEL, FOR SHIPS AND BOILERS.

Bourne-Fuller Co.....Cleveland.

SAFETY VALVES.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.
Crane Co. .....Chicago.
Hayden Mfg. Co., N. L.....Columbus, O.
Lunkenheimer Co. .....Cincinnati.

SAIL MAKERS.

Baker, Howard H. & Co.....Buffalo.
Upson-Walton Co.....Cleveland.
Wilson & Silsby .....Boston.

SALVAGE COMPANIES.

See Wrecking Companies.

SEARCH LIGHTS.

General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

SHEARS.

See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co.....Cleveland.
Otis Steel Co..... ..... Cleveland.

SHIP BUILDERS.

American Ship Building Co.....Cleveland.
Atlantic Works .....East Boston, Mass.
Buffalo Dry Dock Co.....Buffalo.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Chicago Ship Building Co.....Chicago.
Detroit Ship Building Co.....Detroit.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.Newport News, Va.
Risdon Iron Works .....San Francisco.
Roach's Ship Yard.....Chester, Pa.
Shipowner's Dry Dock Co.....Chicago.
Smith & Son, Abram .....Algonac, Mich.
United States Ship Building Co.....New York.
Willard, Chas. P. & Co.....Chicago.

SHIP CHANDLERS.

Baker, Howard H. & Co.....Buffalo.
Marine Mfg. & Supply Co..... ... New York.
Upson-Walton Co.....Cleveland.

SHIP LANTERNS AND LAMPS.

Russell & Watson .....Buffalo.

SHIP TIMBER.

Martin-Barriss Co. .....Cleveland.

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co.....Jersey City, N. J.

STAYBOLTS, IRON OR STEEL, HOLLOW, OR, SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.

Elwell, Jas. W. & Co.....New York.
Gilchrist & Co., C. P.....Cleveland.
Holmes, Samuel .....New York.
McCarthy, T. R.....Montreal, Can.
Weeks, F. H.....New York.

STEAMSHIP LINES, PASS. AND FREIGHT.

American Line.....New York.
Anchor Line..... .....Buffalo.
Erie & Western Trans Co..... .Buffalo.
Goodrich Trans. Co.... ....Chicago.
International Mercantile Marine Co....Philadelphia.
Manitou Steamship Co. ..... Chicago.
Mexican-American S. S Co ... New Orleans, La.
Niagara, St. Catharines & Toronto Ry & Nav. Co..... ..... St. Catharines Ont.
Northern Michigan Trans Co ..... Chicago.
Red Star Line .....New York.
United Fruit Co .... Boston.

STEEL CASTINGS.

Macbeth Iron Co.....Cleveland.
Otis Steel Co..... ....Cleveland.
Seaboard Steel Casting Co.....Chester, Pa.

STEERING APPARATUS.

American Ship Building Co.....Cleveland.
Chase Machine Co.....Cleveland.
Dake Engine Co.....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Marine Mfg. & Supply Co.....Cleveland.
Moulton Steering Engine Co.....New York.
Pawling & Harnischfeger .....Milwaukee.
Sheriffs Mfg. Co. .....Milwaukee.

SUBMARINE DIVING APPARATUS.

Morse & Son, A. J.....Boston.
Schrader's Son, A.....New York.

SURVEYORS, MARINE.

Gaskin, Edward .....Buffalo.
Hynd, Alexander .....Cleveland.
Lovejoy, H. O. .....Buffalo.
Matteson & Drake .....Philadelphia.
Parker Bros. Co., Ltd.... ..... Detroit.
Nacey, James .....Cleveland.
Rice, Henry .....Buffalo.
Steel, Adam .....Cleveland.
Wood, W. J.....Chicago.

TESTS OF MATERIALS.

Hunt, Robert W. & Co.....Chicago.
Pittsburg Testing Laboratory Ltd.....Pittsburg.

TILING, INTERLOCKING RUBBER.

New York Belting & Packing Co.....New York.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Allen, John F. .....New York.
Watson-Stillman Co. .....New York.

TOOLS, WOOD WORKING.

Atlantic Works, Inc.....Philadelphia.

TOWING MACHINES.

American Ship Windlass Co.....Providence, R. I.
Chase Machine Co.....Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co....Kingston, Ont.
Great Lakes Towing Co.. ....Cleveland.
Midland Towing & Wrecking Co., Ltd.Midland, Ont.

TRAPS, STEAM.

Kieley & Mueller .....New York.
Lunkenheimer Co. .....Cincinnati.
Sturtevant Co., B. F., Jamaica Plain.....Boston.

Buyers' Directory of the Marine Trade.—*Continued.*

TRUCKS.

Boston & Lockport Block Co.....Boston.

TUBING, SEAMLESS.

Shelby Steel Tube Co.....Pittsburg, Pa.

VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge Co.....Boston.
Ashton Valve Co .....Boston.
Crane Co. .....Chicago.
Jenkins Bros. .....New York.
Kieley & Mueller .....New York.
Lunkenheimer Co. .....Cincinnati.
Ross Valve Co. .....Troy, N. Y.

VALVES FOR WATER AND GAS.

Ross Valve Co.....Troy, N. Y.

VARNISHES.

Detroit Varnish Co .....Detroit.
Detroit White Lead Works.....Detroit.
Forest City Paint & Varnish Co.. .. ..Cleveland
New Jersey Zinc Co.....New York.
Also Ship Chandlers.

VENTILATING APPARATUS FOR SHIPS.

Bayley & Sons Co., Wm.....Milwaukee, Wis.
Sturtevant, B. F. Co.....Boston.

VESSEL AND FREIGHT AGENTS.

Boland, John J.....Buffalo.
Brown & Co. .....Buffalo.
Elwell, Jas. W. & Co.....New York.
Elphicke, C. W. & Co.....Chicago.
Fleming & Co., P. H.....Chicago.
Gilchrist & Co., C. P.....Cleveland.
Hall & Root .....Buffalo.
Helm & Co., D. T.....Duluth.
Hawgood & Co., W. A.....Cleveland.
Holmes, Samuel .....New York.
Hutchinson & Co. .....Cleveland.
Lester, S. S.....Quebec, Can.
McCarthy, T. R.....Montreal.
Mitchell & Co. .....Cleveland.
Parker Bros. Co., Ltd. .... Detroit.
Prindiville & Co. .....Chicago.
Richardson, W. C. .....Cleveland.
Sullivan, D. & Co.....Chicago.
Weeks. F. H.....New York.

WATER GAUGES.

Bonner & Co., Wm. T.....Boston
Lunkenheimer Co.....Cincinnati, O.

VESSEL FURNISHINGS.

Meckes, John .....Cleveland
Siegel Cooper Co.....New York.
Sterling & Welch Co. ....Cleveland.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co.....Buffalo.
DeGrauw, Aymar & Co.....New York.
Upson-Walton Co. .....Cleveland.

WHISTLES, STEAM.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.
Lunkenheimer Co. .....Cincinnati.

WINDLASSES.

American Ship Windlass Co.....Providence, R. I.
American Ship Building Co.....Cleveland.
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Marine Mfg. & Supply Co ....New York.

WINCHES.

American Ship Windlass Co.....Providence, R. I.
Georgian Bay Engineering Works.....Midland, Ont.
Hyde Windlass Co.....Bath, Me.

WOOD WORKING MACHINERY.

Atlantic Works, Inc.....Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co..Kingston, Ont.
Great Lakes Towing Co.... .... Cleveland
Midland Towing & Wrecking Co., Ltd.Midland, Ont.
Parker Bros. Co., Ltd..... .....Detroit.

YACHT AND BOAT BUILDERS.

Drein, Thos. & Son.....Wilmington, Del.
Georgian Bay Engineering Works .... Midland, Ont
Lane & DeGroot.....Long Island City, N. Y.
Marine Construction & Dry Dock Co....New York.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Willard, Chas. P. & Co.....Chicago.

YAWLS.

Drein, Thos. & Son.....Wilmington, Del.
Lane & DeGroot.....Long Island City, N. Y.

ALPHABETICAL INDEX OF ADVERTISERS IN THE MARINE REVIEW.

The star (*) indicates that the advertisement appears alternate weeks. For addresses see advertisements on pages noted.
The dagger (†) indicates that advertisement appears once a month.

*Allen, John F..... 3
Almy Water Tube Boiler Co....43
American Bureau of Shipping...44
American Injector Co..... 4
American Line 39
American Ship Building Co.....11
American Ship Windlass Co.... 2
American Steam Gauge Co.....45
Anchor Line 39
Armstrong Cork Co.....56
Ashton Valve Co.....14
Atlantic Works 41
†Atlantic Works, Inc. 9

Babcock & Wilcox Co..... 8
Bayley & Sons Co., Wm. 4
Baldt Anchor Co..... 55
Baker, Howard H. & Co.....56
Blake, Geo. F., Mfg. Co..... 14
Blickensderfer Mfg. Co 45
Boland, J. J.....48
*Boston & Lockport Block Co... 37
Bourne-Fuller Co. 14
Bowers, L. M. & Co..... 55
Brown Hoisting Machinery Co., Inc. 2
Buffalo Dredging Co. 54
Buffalo Dry Dock Co. 10

†Camden Anchor-Rockland Machine Co.....13
Chase Machine Co..... 6
*Chelsea Clock Co. 3
Chicago & Gt. L. Dredge & Dock Co. 54
Chicago Ship Building Co.....10
Cleveland City Forge & Iron Co.47
Continental Iron Works..... 2
*Contractors' Supply & Equipment Co..... 9
Cory, Chas. & Son.....46
*Craig Ship Building Co.....11
Cramp, Wm. & Sons, S. & E. B. Co. 41
*Crandall & Son, H. I. 3
Crane Co. 43-44

Dake Engine Co. 46
Dearborn Drug & Chemical Wks. 9
DeGrauw, Aymar & Co.....47
Delauney, Belleville & Co.....14
Delaware River Iron S. B. & E. Works 41
Detroit Ship Building Co.....11
Detroit White Lead Works..... 2
Dixon Crucible Co., Joseph.....46
Donnelly Salvage & Wrecking Co. 44
Drein, Thos. & Son 40
Dunbar & Sullivan Dredging Co..54

Elphicke, C. W. & Co.....48
Elwell, Jas. W. & Co.....48
Erie & Western Trans. Co 39

Falls Hollow Staybolt Co.....47
Faust, Wm. H.....48
Ferdinand & Co. L. W 4
Fields, Capt. J. M..... 49
Fitz-Simons & Connell Co.....54
Fix's S., Sons..... 46
Fleming & Co., P. H..... 48
Fletcher, W. & A. Co.....41
Fogg, M. W. 2
Fore River Ship & Engine Co...41
Forest City Boiler Co.....54
Forest City Paint & Varnish Co.. 42
Frankfort M. A. & P. G. I. Co...44

General Electric Co.....14
*Georgian Bay Engineering Works.41
Gilchrist, Albert J. 48
Gilchrist & Co., C. P.....48
Gogebic Steam Boiler Works 41
Goodrich Trans. Co..... 39
Goulder, Holding & Masten.....48
Great Lakes Engineering Works. 5
Great Lakes Register 4
*Great Lakes Towing Co.....11

Hall & Root 48
Hanna, M. A. & Co.....47
Hawgood & Co., W. A. 48
Helm & Co., D. T.....48
Hickler Bros..... 54
Holmes, Samuel 48
Hoyt, Dustin & Kelley.....48
Hunt, Robert W. & Co.....49
Hutchinson & Co. 48
Hyde Windlass Co.....56
Hynd, Alexander 49

International Mercantile Marine Co. 39
Ironville Dock & Coal Co.....47

Jenkins Brothers 12
Jenks Ship Building Co.....14

Kahnweiler's Sons, David.....40
Katzenstein, L. & Co.....47
Kidd, Joseph 49
*Kieley & Mueller 43
Kingsford Foundry & Machine Works 42
Kremer, C. E. 48

Lackawanna Railroad 55
Lane & DeGroot 40
*Learmonth, Robert 40
Lebanon Chain Works 46
Lester, S. S..... 48
Lidgerwood Mfg. Co.....45
Lockwood Mfg. Co.....41
Lovejoy, H. O.....49
L. S. & M. S. Ry.....55
Lunkenheimer Co. 46

McCarthy, T. R. 48
McCurdy, Geo. L..... 44
†McNab & Harlin Mfg. Co.....

Macbeth Iron Co.....56
MacDonald, Ray G..... 49
Manitowoc Dry Dock Co.....41
Manitou Steamship Co. 38
Marine Iron Co., Bay City, Mich.47
Marine Iron Co., Duluth.....41
Marine Mfg. & Supply Co.....40
Martin-Barriss Co. 43
Matteson & Drake 40-49
Mexican-American S. S. Co 39
Midland Towing & Wrecking Co., Ltd. 56
Mietz, Aug..... .. 6
Milwaukee Dry Dock Co.....10
Mitchell & Co. 48
Morse & Son, A. J.....46
Mosher Water-Tube Boiler Co...43
Moulton Steering Engine Co...42

Nacey, James 49
Newport News Ship Building & Dry Dock Co..... 7
New Jersey Zinc Co..... 6
New York Belting & Packing Co. 4
Niagara, St C. & T. Ry. & N. Co.. 38
Northern Mich. Trans. Co 38
Northwestern Steam Boiler & Mfg. Co. 42

Otis Steel Co..... ... 3

Parker Bros. Co. 48
Pawling & Harnischfeger 42
Peck, Chas. E. & W. F.....44
*Penberthy Injector Co..... 3
Phosphor Bronze Smelting Co., Ltd. 40
Pickands, Mather & Co.....47
Pittsburg Coal Co..... 9
Pittsburg Testing Laboratory, Ltd. 49
Potter & Potter 49
Potter, J. D. 40
Powell, Ambrose V.....49
Prindiville & Co.....48

Record of American & Foreign Shipping 44
Red Star Line 39
Rice, Henry 49
Richardson, W. C.....48
Risdon Iron Works 41
*Ritchie & Sons, E. S.....44
Roberts Water-Tube Boiler Co... 42
Roelker, H. B. 41
Ross Valve Co. 46
Russell & Watson 40

Sadler, Perkins & Field 49
Safety Car Heating & Lighting Co. 8
Scherzer Rolling Lift Bridge Co.. 42
Schrader's Sons, A..... 2
Seaboard Steel Casting Co..... 37
Shaw, Warren, Cady & Oakes... 49
*Shelby Steel Tube Co..... 8
Sheriffs Mfg. Co.....44
Shipowners' Dry Dock Co.....41
Shipping World 7
Sipe & Co., James B..... 9
*Smith & Son, Abram 47
Smith Co., L. P. & J. A.....54
Smith Premier Typewriter Co. 45
Smith Coal & Dock Co., Stanley B. 9
Smith, Stanley B. & Co..... 9
Smooth-On Mfg. Co..... 38
Standard Chain Co.....45
†Standard Gauge Mfg. Co.....9
*Standard Oil Co.....55
Starke Dredge & Dock Co., C. H. .54
Steel, Adam 49
Sterling & Welch Co 45
Stirling Co. 8
Stratford Oakum Co., Geo.....45
Sturtevant, B. F. Co.....56
Sullivan & Co. 48
Superior Ship Building Co.....40

Taylor Water-Tube Boiler Co...43
*Temple Pump Co.....40
Thropp, J. E. & Sons Co.....46
Trout, H. G 45
Truscott Boat Mfg. Co.....40

Union Machine & Boiler Co.....47
United Fruit Co 39
Upson-Walton Co. 56
U. S. Metallic Packing Co.....56
U. S. Ship Building Co..... 3

Victor Metals Co. 2

Walker, Thomas & Son.....43
*Watson-Stillman Co. 55
Weeks, F. H. 48
Westinghouse Electric & Mfg. Co. 43
White, Johnson, McCaslin & Cannon 48
*Willard, Chas. P. & Co.....37
Wood, W. J. 49

Youghiogheny & Lehigh Coal Co..47

THE
L. P. & J. A. SMITH
COMPANY.

CONTRACTORS FOR PUBLIC WORKS

Dredging,	Dry Docks and	Bridges,
Harbor Work,	Pier Building,	Submarine
Pile Driving,	Railroads,	Foundations,
Breakwaters,	Canals,	Etc., Etc.

Offices: Williamson Bldg., Cleveland, O.

Dunbar & Sullivan Dredging Co., of Buffalo, N. Y.

Will contract to remove ROCK or EARTH on the Great Lakes to 40 ft. depth.
To remove ROCK on Atlantic Coast to 40 ft. depth.

THAT'S ALL.

We SOMETIMES rent plant to responsible parties at OUR terms.

Dredges.
Brian Boru, Steel.
Tipperary Boy, Steel.
Erin Go Braugh.

Drill Boats.
Geo. A. Howells and another, both Steel.

Tugs.
Shaughraun, Steel.
Phil Sheridan, Steel.
Spalpeen, Steel.
Paddy Miles, Steel.
Shaun Rhue, Steel.

Derrick.
Faugh a Ballaugh.

Scows.

Monroe Doctrine,	600 yds., Steel.
Protective Policy,	500 yds., Steel.
Reciprocity,	600 yds., Steel.
Cuba Libre.	250 yds., Steel.
Gold Standard,	250 yds., Steel.
No. 5,	600
No. 6,	600
No. 7,	600
No. 8,	600
	4,600

McMyler derrick handling 10 tons at 75 ft. radius.

Small Scows.

The Fitz-Simons & Connell Co.

CONTRACTORS
FOR
PUBLIC WORKS

DREDGING
DOCKS
PILE DRIVING
BREAKWATERS

TUNNELS
CANALS
BRIDGES
FOUNDATIONS

Offices: 1010-1014 Tacoma Building, Chicago.

HICKLER BROTHERS

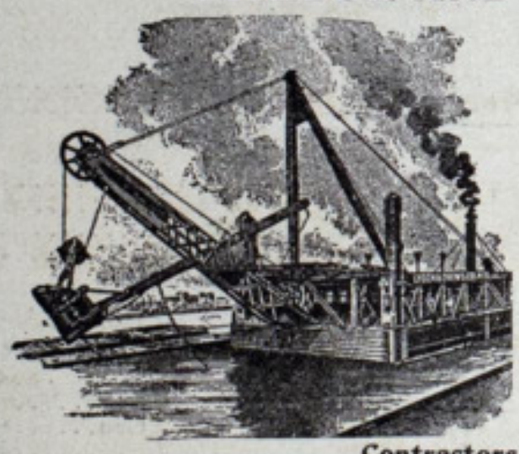
MARINE RAILWAY

Capacity, 1,000 tons.
Draft, 7½ ft. forward, 13½ ft. aft.
Length on keel blocks, 180 ft.; over all, 190 ft.

Machine Shop, Foundry and Steam Forge.
Dredges, Drill Boats and Derrick Scows.

SAULT STE. MARIE, - MICH.

CHICAGO & GREAT LAKES DREDGE AND DOCK CO.



OWNS AND OPERATES THE PLANTS OF THE FORMER COMPANIES:

Lydon & Drews Co.,
Hausler & Lutz Co.,
Green's Dredging Co.,
Chicago Star Con. & D. Co.,
McMahon & Montgomery Co.,
Chicago Dredging & Dock Co.,
Griffith, McDermott & Watt Dredging Co.

Contractors for
RIVER AND HARBOR IMPROVEMENTS.
Main Office:—1319-1322 Chamber of Commerce - CHICAGO.

C. H. STARKE DREDGE & DOCK CO.,

Contractors for Public Works.

DREDGING, PILE DRIVING,
AND
SUBMARINE PIPE LAYING.

Canal Street, West of First Avenue,

Milwaukee, - - Wisconsin.

BUFFALO DREDGING CO.

GENERAL CONTRACTORS ON SUBMARINE WORK.

Office D. S. MORGAN BLDG. ***BUFFALO, N. Y.***

John D. Gilchrist, Pres. John Marron, Sec'y.
John A. Flajole, Gen'l Mgr.

THE FOREST CITY BOILER CO.

Marine Work a Specialty.

264 Merwin St. **Tel. Main 1886**
CLEVELAND, OHIO.

A COMPLETE SET OF CHARTS OF THE GREAT LAKES

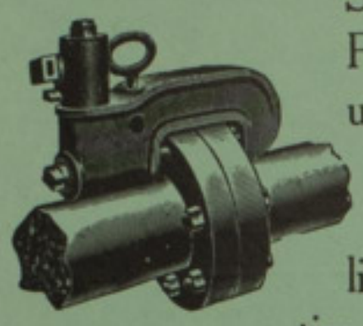
ELEVEN IN ALL.
(Edges bound with Tape to Prevent Tearing.)

Sent to any Address, Carriage Prepaid for $5.45.

THE PENTON PUBLISHING CO., 39-41 WADE BUILDING, CLEVELAND, OHIO.

MARINE HYDRAULIC JACKS.

Coupling Bolt Forcers, Shaft Straighteners, Punches, Benders, Presses and Jacks for Marine use of every description.



We are builders of Hydraulic Tools, and with our facilities we can design and build any special Marine Hydraulic Machine or Tool that may be needed.

Our index No. 65, Edition "N," illustrates the broadness of our regular line.

WATSON-STILLMAN CO.

OFFICES: 46 Dey Street, NEW YORK. 453 The Rookery, CHICAGO.

WORKS: Aldene, Union County, N. J.

LATEST PATENT ANCHOR

THE NATIONAL

APPROVED BY LLOYDS.

Manufactured by

L. M. BOWERS & CO.,

Binghamton, N. Y

Catalogue on Application.

The National and International

ANCHORS.

Furnished to the Lake Trade by

The Upson-Walton Co.,

CLEVELAND, O.

IN A RECENT TEST

MADE BY UNCLE SAM,

where both Foreign and Domestic Anchors were considered, the . . .

Baldt Stockless Anchor

was the only one approved

For Catalogue and particulars address

The Baldt Anchor Co., Chester, Pa.

"Steel Ships

THEIR CONSTRUCTION AND MAINTENANCE."

A valuable work, just from the press, by THOMAS WALTON, Author of "Know Your Own Ship."

Not highly technical, but well suited to Ship Superintendents, Marine Engineers, and students of ship construction.

INTRODUCTION deals with steel from its crude state in ore to finished product in ship material. Then follows chapters dealing with principal structural features and alternative modes in which a vessel may be built. Largest section of the book treats in detail of the construction and combination generally of the various parts which go to make up the whole ship structure—framing, plating, stern frames and rudders, riveting, pumping and ventilation and includes also remarks upon launching

Price, $5.50.

THE MARINE REVIEW
CLEVELAND, O.

A Chance Courtship

is a story of an unconventional love match, well told and beautifully illustrated. As a bit of readable fiction the story is well worth writing for. It is contained in a handsomely bound book of 128 pages, a portion of which is devoted to the attractive mountain and lake resorts along the Lackawanna Railroad. It is a book you will like to see. It may be had by sending 10 cents in postage stamps to T. W. LEE, General Passenger Agent, Lackawanna Railroad, New York.

STEEL SHIPS: Their Construction and Maintenance.

A manual for ship builders, ship superintendents, students and marine engineers.

BY THOMAS WALTON.

Price $5.50.

The Marine Review, Cleveland, O.

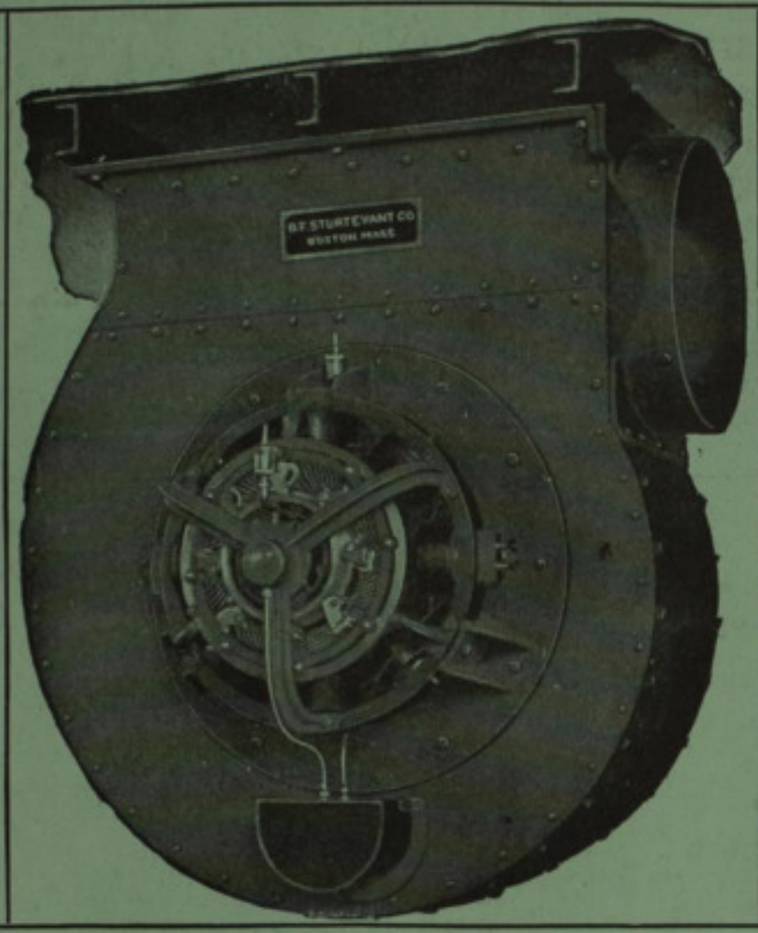
LAKE SHORE & MICHIGAN SOUTHERN RY.

Eastward.	Arrive from West	Depart East.
No. 18, Southwestern Lim	.....	*1:50am
No. 22, Lake Shore Lim...	*2:12am	*2:20am
No. 20, Chi & Cleve Ex....	*7:20am	.....
No. 28, N Y & Bost Ex....	*7:40am	*8:00am
No. 40, Toledo & Buff Ac.	†10:00am	†10:40am
No. 32, Fast Mail	*11:25am	*11:30am
No. 48, Ac via Sandusky..	†1:40pm	.....
No. 44, Cleve. & N. Y Sp.	.....	*3:00pm
No. 46, Southwestern Ex.	.....	*3:10pm
No. 116, Conneaut Accom	.....	†4:30pm
No. 6, Lim Fast Mail....	*5:40pm	*5:45pm
No. 26, 20th Cent Lim.....	*7:40pm	*7:43pm
No. 10, C., N Y & B Sp....	*7:30pm	*7:50pm
No. 16, New Eng Ex.....	*10:30pm	*10:35pm
No. 2, Day Express.....	†9:10pm	†9.25pm
No. 126, Norwalk Accom.	†8:10am	.....

Westward.	Arrive from East.	Depart West.
No. 11, Southwestern Lim	*3:25am	.....
No. 7, Day Express..	.....	†6:00am
No. 15, Bost & Chi Sp.....	*3:05am	*3:15am
No. 19, Lake Shore Lim..	*7:05am	*7:15am
No. 23, Western Express.	*10:30am	*10:35am
No. 29, Southwestern Sp.	‡11:10am	.....
No. 33, Southwestern Ex	*12:25pm	.....
No. 133, Cleve & Det Ex..	.....	*12:45pm
No. 47 Accomodation.....	†11.00am	†3:00pm
No. 141, Sandusky Accom.	.....	†3:10pm
No. 43, Fast Mail	*4:35pm	*4:40pm
No. 127, Norwalk Accom..	.....	†5:10pm
No. 37, Pacific Express...	*6:50pm	*7:20pm
No. 3, Fast Mail Lim.....	*10:50pm	*10:55pm
No. 115, Conneaut Accom.	*8:30am	.....

*Daily. †Except Sunday. ‡Except Monday
Trains Nos. 23, 28 and 37 run via Erie Station.
City Ticket Office 237 Superior St.

Electric Fans for Ship Ventilation.



B. F. Sturtevant Company,
Boston, Mass.
New York. Philadelphia. Chicago. London.
(9)

Marine Repairs
AND
Castings

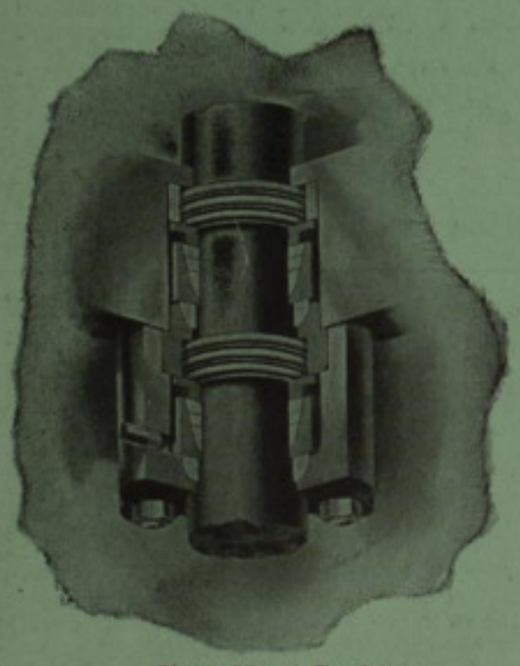
The Macbeth Iron Company,
CLEVELAND, OHIO,

JAMES PLAYFAIR, {Pres't and Gen. Mgr.} D. L. WHITE, Vice President.
J. W. BENSON, Secretary and Treasurer.

MIDLAND TOWING and WRECKING CO., Ltd.

MIDLAND, ONT., CANADA.

FIRST-CLASS TUGS FOR WRECKING, RAFT TOWING, Etc., STEAM PUMPS, DIVERS, JACKS, HAWSERS, LIGHTERS.



Class No. 1 Packing.

United States Metallic Packing Co.

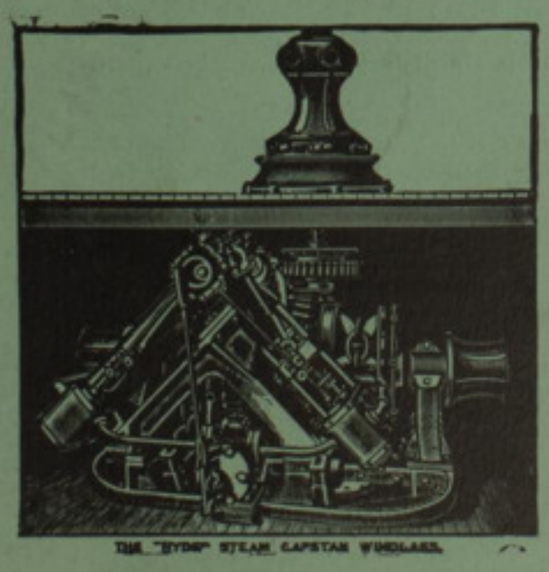
427 NORTH 13TH ST.
PHILADELPHIA, PENN.

SEND FOR CATALOG

CHICAGO
509 Great Northern Building

We have over one thousand varieties of
BLOCKS
STEEL, IRON AND WOOD.
If interested, let us send you catalogue.
The UPSON-WALTON Co.,
Cleveland.

WINDLASSES AND CAPSTANS



The Hyde Steam and Power Windlasses and Capstans are the best in the market.

They have been selected for most of the vessels now building for the Navy Department, Revenue Marine, Light-house Board and United State Coast Survey

They are being furnished for the majority of the highest class Steam Ships, Merchant Vessels and Yachts now building.

HYDE WINDLASS COMPANY, BATH MAINE.

LIFE PRESERVERS—BUOYS.

Acme. Solid Cork. Granulated Cork. Each Preserver stamped by U. S. Inspector guaranteeing proper buoyancy. Cork Filled Yacht Fenders. Cork Mooring Buoys. Material and Finish Guaranteed. Orders filled promptly.

ARMSTRONG CORK COMPANY,

Boston. New York. Philadelphia. Pittsburg. Chicago. St. Louis. Baltimore.

Howard H. Baker & Co.,
SHIP CHANDLERS
and SAIL MAKERS

18 to 26 Terrace, BUFFALO, N. Y.

VOL. XXIX. CLEVELAND, O., JUNE 9, 1904. No. 23

During the last thirty-three years we have fitted out hundreds of vessels complete for service on both salt and fresh water, among which are the following:

Str. Raleigh
" Peerless
" Sarah E. Sheldon
Sch. Camden
" Ahira Cobb
" Pelican
" G. H. Warmington
" Nellie Redington
" Thomas Quayle
Str. Selah Chamberlain
" Amazon
" David Ballentine
" Egyptian
" D. M Wilson
" Oscar Townsend
" Cormorant
" David W. Rust
Sch. A. B. Moore
" Sophia Minch
" Journeyman
" C. H. Burton
" John Martin
" Helvetia
" Henry A. Kent
" Three Brothers
Str. E. B. Hale
" C. J. Kershaw
" Persian
" James Davidson
" Ohio
Sch. Edward Kelly
" D E. Bailey
" Our Son
Str. H. D. Coffinberry
" Wm. Edwards
" John N. Glidden
Sch. Thomas Gawn
Str. Smith Moore
" Wokoken
" Hiawatha
" Henry Chisholm
Sch. Minnehaha
Str. Republic
" Ogemaw
" Columbia
" Tacoma
" Onoko
" Continental
" Robt Wallace
" H. E. Packer
" Wallula
Sch. Golden Age
Str. Kalkaska
" George Spencer
" Kasota
" William Chisholm
Sch. David Wallace
" John Shaw
Str. Spokane
" C. Tower, Jr.
" Sitka
Sch. Wadena
Str. Aurora
" Frank L. Vance
" J. C. Gilchrist
" Yakima

Str. P. P. Pratt
" Henry J. Johnson
" Neosho
" E. P. Wilbur
" John Craig
" Britannic
" Germanic
" Northern Light
" Volunteer
" Northern Queen
Sch. Annie M. Ash
" Mary Woolson
" Mary B. Mitchell
Str. Niko
" C W. Elphicke
" Thos W. Palmer
" Livingstone
" Manchester
" Neshoto
" Cayuga
" Seneca
" A. G. Lindsley
" J. C. Lockwood
" Gov. Smith
" Castalia
" Saranac
" Tuscarora
Sch. B. L Pennington
Str. S C. Kirby
" Maryland
" C. B. Lockwood
" Western Reserve
" Norman
Sch. Churchill
Str. Saxon
" German
" Briton
" Wawatam
" Griffin
" Grecian
" Roman
" U. S. S. Amaranth
" Samuel Mitchell
" Schuylkill
" Andaste
" Choctaw
" Vega
" North West
" I. W. Nicholas
" Chili
" North Land
" Yale
Sch. Tyrone
Str. W. D. Rees
" Queen City
" James Watt
" Coralia
" Bessemer
" Siemens
" Andrew Carnegie
" Empire City
" U S. S. Gresham
" Minnetonka
" Minnewaska
Sch. Sidney G. Thomas
" Antrim

Sch. Polynesia
" Roebling
" Fritz
" Australia
" D. Z. Norton
" S. O. Co. No. 4
" S. O. Co. No. 5
" S. D. Warriner
" A. W. Thompson
" Alex. Maitland
Str. Morse
" U. S. S. Algonquin
" U. S. S. Onondaga
" Superior City.
" Presque Isle
" W R Linn
" Clarence A. Black
" Huron
" H. S. Holden
" Ann Harbor No. 3
" Mataafa
" H. W. Oliver
" Eureka
" M. A. Hanna
" Mae
" H. C. Frick
" Douglass Houghton
" Porto Rico
" Isaac Ellwood
" W Castle Rhodes
" W. E. Reis
" O. M. Poe
" Wm. Edenborn
" John W. Gates
" James J Hill
" La Fayette
" Princeton
" W. P. Palmer
" A. B. Wolvin
" Rensselaer
" Ravenscraig
" Capt. Thomas Wilson
" Paraguay
" Ascuncion
" John J. Albright
" Walter Scranton
" Neptune
" Saturn
" Venus
" Uranus
" Jupiter
" Mars
" John T. Hutchinson
" Lake Shore
" Gilchrist
" G. A. Flagg
" R. W. Warner
" Mauch Chunk
" Frank H. Peavey
" George W. Peavey
" Pere Marquette 17
" Christopher
" W. S. Mack
" Buckman
" W. F. Fitch
" William Nottingham

Str F. M. Osborn
" Frank W. Hart
" E. N. Saunders
" C. W. Watson
" Steel King
" Harold B. Nye
" J. M. Jenks
" Etruria
" Bransford
" L. C. Smith
" Sultana
" G. J. Grammer
" Sonora
" W. H. Gratwick
" Jas. Gailey
" W. C. Richardson
" Watson
" Frank H. Goodyear
" Moses Taylor
" A. E. Stewart
" Pere Marquette 18
" Jas. H. Hoyt
" Redondo
" Chas. Beatty
" Thos. Adams
" Toledo
" M. M. & N. No. 1
" William H. Mack
" Anna C. Minch
" Saxona
" H. B. Hawgood
" Hurlbut W. Smith
" Monroe C. Smith
" B. Lyman Smith
" Wilbert L. Smith
" Lewis Woodruff
" R. E. Schuck
" Jos. C. Gilchrist
" I. S. Keefe
" Robt. Wallace
" P. P. Miller
" G. Watson French
" Sinaloa
" Sonoma
" Frank W. Gilchrist
" J. L. Weeks
" Henry S. Sill
" John Sharples
" H. G. Dalton
" D. G. Kerr
" D. M. Clemson
" Winnebago
" George L. Craig
" City of South Haven
" John C. Howard
" Pere Marquette 19
" Pere Marquette 20
" Wisconsin
" Kensington
" Marquette & Bessemer No. 1
" Edwin F. Holmes
" Sahara
" Umbria
" Francis Widlar
" Martin Mullen
" Augustus B. Wolvin

The UPSON-WALTON Co., CLEVELAND, OHIO.

AZALEA Anti-Friction METAL

Highest Grade Bearing Metal.

...Used for...

MARINE and STATIONARY ENGINES, MACHINERY and RAILROADS.

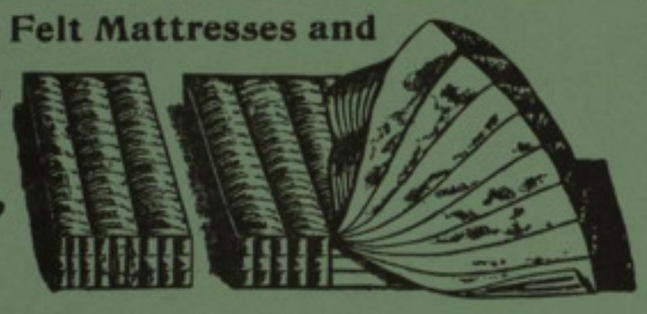
Send for free sample for trial.

ONCE TRIED, ALWAYS USED.

THE VICTOR METALS CO.,

East Braintree, Mass. New York Office, 29 B'way.

Fogg's Resilent Felt Mattresses and Cushions.



Manufactured by

M. W. FOGG,

202 Front St., N. Y.

Send for Illustrated Catalogue.

Detroit White Lead Works

DETROIT VARNISH COMPANY,

Manufacturers of

Paints, Varnishes and Specialties specially prepared for marine use.

DETROIT. - CHICAGO. - BUFFALO.

CLEVELAND BRANCH: 37 River St., West.

Improved Bolt Helmet

Established 1844.

A. SCHRADER'S SON.

32 Rose Street, NEW YORK.

Manufacturer of

Submarine Armor and Diving Apparatus.

We carry a complete stock of Dresses, Hose and Repair Sundries.

All orders filled day received. Write for our prices.

THE BROWN HOISTING MACHINERY COMPANY. INCORPORATED.

Engineers, Designers, and Manufacturers of Special Machinery for hoisting, conveying, storing and handling material of all kinds under the well known "BROWNHOIST" Patents.

BRIDGE UNLOADERS for rapidly discharging bulk cargoes from vessels directly to cars to storage on docks.

Fast Plant Unloaders for rapidly handling either bulk or package freight

CRANES of every description for every kind of service.

MAIN OFFICE AND WORKS, CLEVELAND, OHIO, U. S. A.

Eastern Office, 26 Cortlandt St., New York City. Pittsburg Office, Carnegie Building, Pittsburg, Pa. European Office, 39 Victoria St. London, S. W.

Established 1857.

AMERICAN SHIP WINDLASS CO.

PROVIDENCE, R. I.

We have completed our new IRON FOUNDRY, and are prepared to execute orders for Castings, guaranteeing first-class work, prompt service and reasonable prices.

SHIP MACHINERY EMBODYING THE LATEST DESIGNS AND MANY IMPORTANT PATENTED IMPROVEMENTS.

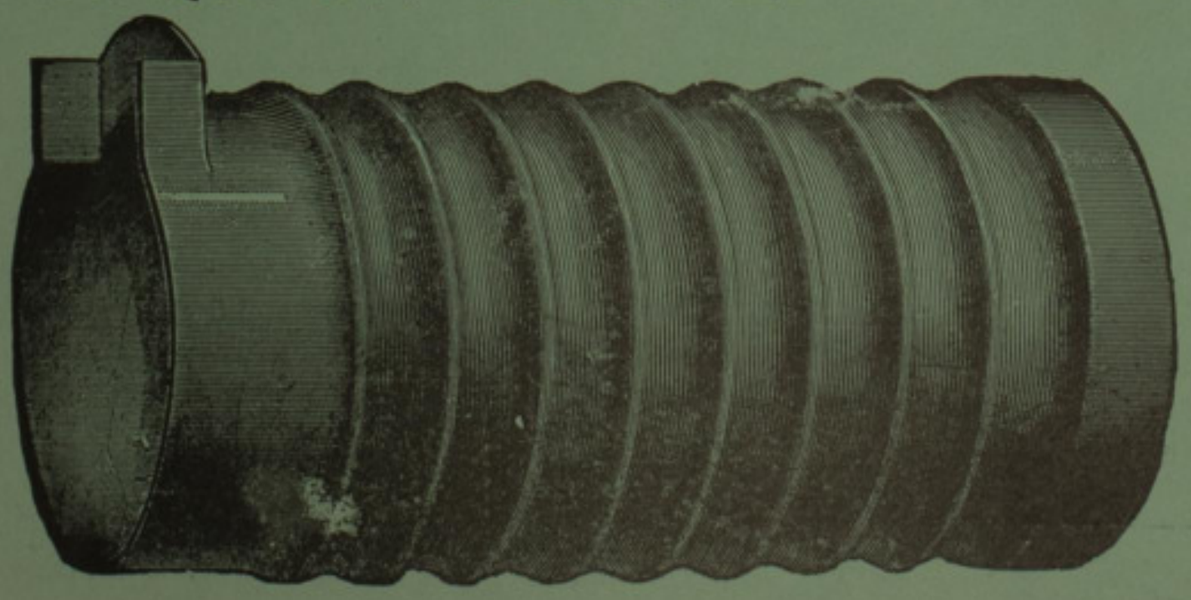
SOLE BUILDERS OF THE

Original and Only Automatic Steam Towing Machine.

SEND FOR ILLUSTRATED CATALOGUE.

P. O. BOX 53. **Address: FRANK S. MANTON, President.**

MORISON SUSPENSION BOILER FURNACES



FOR LAND AND MARINE BOILERS.

UNIFORM THICKNESS—EASILY CLEANED
UNEXCELLED FOR STRENGTH.

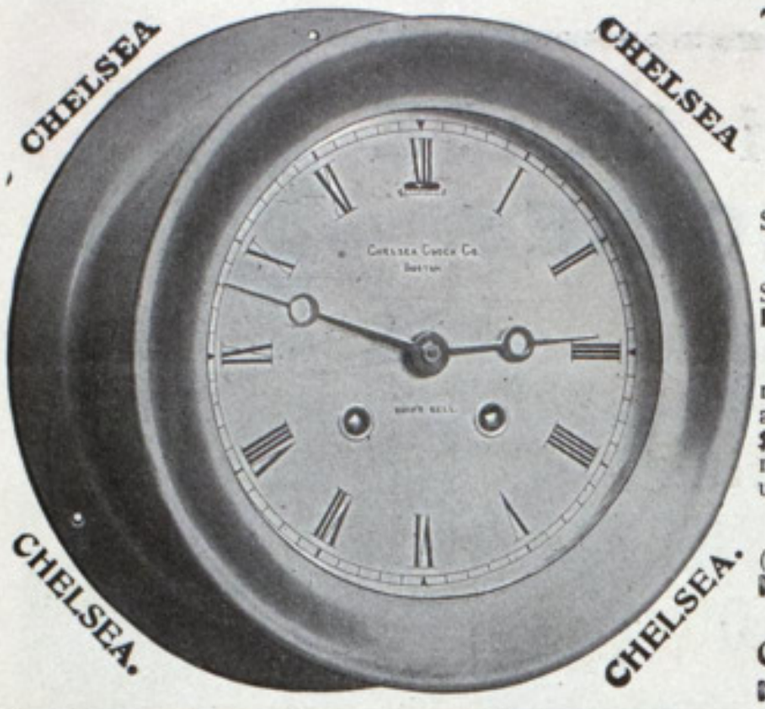
Also Fox Corrugated Furnaces.

MANUFACTURED BY

THE CONTINENTAL IRON WORKS,

West and Calyer Sts., NEW YORK.

Near 10th and 23d Sts. Ferries. Borough of Brooklyn.



The Justly Celebrated "CHELSEA"

(Patented in the United States and Great Britain)

BEST IN THE WORLD

STRIKING SHIP'S BELL CLOCK

THE clock for use in Pilot Houses, Cabins and EACH stateroom on YACHTS, fine passenger STEAMSHIPS, etc., etc.

8-Day, Jewelled Escapements Excellent Timekeepers.
Solid Cast Brass Screw Bezel Cases; Fog and Dust Proof.

Size of Clock (Dial)	4½ in.	6 in.	8½ in.	10 in.	12 in.
PRICE (in *Screw Bezel* Case),	$42	$47			
" (in *Hinged Bezel* Case),	45	50	$55	$60	$65

Hinged Bezel Cases recommended for 8½, 10 and 12 in. sizes, and for all sizes to be used Permanently with bases. Special base, for using clock on Desks, Mantels, etc., in Clubs, Offices, Libraries and Sleeping Rooms, made of Mahogany and Polished Brass, the latter finished like clock case, costs $9 to $33 extra, according to size of clock. Cases are finished Polished Brass, Black Oxide or Nickel as may be ordered. Also High-Grade **Engine Room** and **Non-Magnetic** Lever Clocks and Office pendulum Clocks; *and* **HIGH-GRADE 8-DAY** (dial) $27, 3½ in. (dial) $33. For **AUTO CLOCK** (Trade Mark) in **DUPLEX** (patent applied for) Solid Cast Brass Screw Bezel Cases, the most thoroughly **WATER PROOF CASE** on the market. Two sizes, 2¾ in. **MOTOR CARS AND MOTOR BOATS.**

ON SALE by Leading Dealers in Best Clocks, Jewelry, Nautical Instruments, and Yachting Supplies, etc., etc. YOU want the BEST? Ask for the "CHELSEA" CLOCK.

CHELSEA CLOCK CO., Dept. D, 16 State St., Boston, Mass., U. S. A.

Order for **Export** through responsible **American Shipping** and **Commission Houses.**

The United States Shipbuilding Company

43 Cedar Street, New York

Builders of all Types of Vessels

The only Company in the world that can

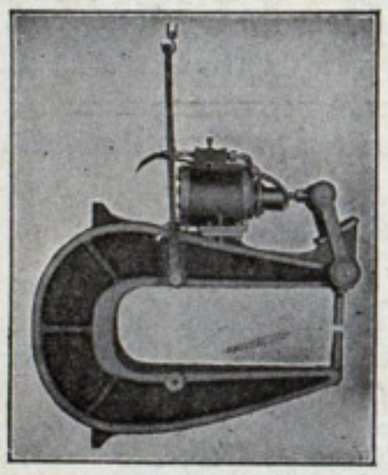
BUILD, EQUIP, ARM AND ARMOR A Modern Battleship

without calling upon outside assistance

CAN MAKE AGREEMENTS COVERING REPAIRS OR BUILDING ON

Atlantic and Pacific Oceans

ALLEN PORTABLE PNEUMATIC *RIVETING MACHINES.*



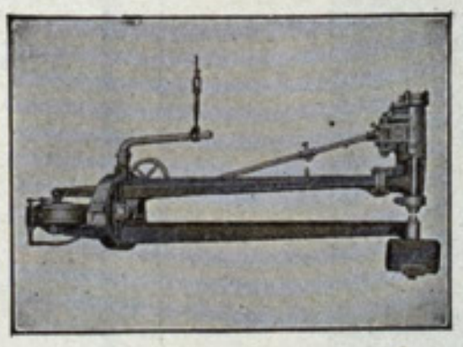
"Cable Address, Riveters" W. U. Code

The following concerns are using our machines

Unites States Navy Yard, Bremerton, Wash.

United States Navy Yard, Portsmouth, N. H.

United States Navy Yard, Mare Island, San Francisco, Cal.

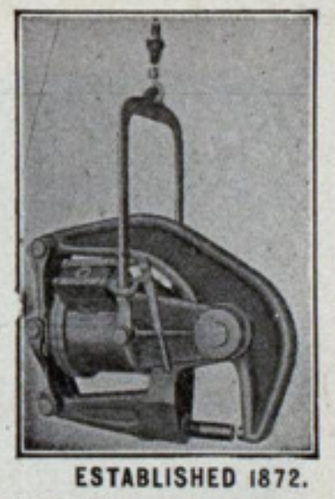


Brown Hoisting Machinery Co., Cleveland, O.

New York Ship Building Co. Camden, N. J.

Wm. R. Trigg Co., Richmond, Va.

Canadian Ship Building Co. Bridgeburg, Ont.



ESTABLISHED 1872.

JOHN F. ALLEN, 370-372 Gerard Avenue, NEW YORK

Steel Castings

from 100 to 75,000 lbs.

Otis Steel

Ship Plates
Flange Plates
Tank Plates
Steel Car Axles
Forgings of all kinds

"Otis" Fire Box Plates a Specialty.

OTIS STEEL CO., Ltd.,
Head Office and Works, CLEVELAND, O.

AGENCIES.

New York: Thorpe, Platt & Co., 97 Cedar St.
Montreal: Homer Taylor, 183 St. James St.
St. Louis: C. A. Thompson, 516 N. Third St.
San Francisco: John Woodlock, 154-156 First St.

U.S. AUTOMATIC INJECTOR

A feature of the

U. S. Automatic Injector

worthy of every engineer's attention is the drip-cock, which drains the injector, and keeps it free from water when not in use.

It lengthens the life of the injector, and insures it against freezing in cold weather.

This is only one point in which the U. S. AUTOMATIC INJECTOR surpasses all others. Send for our catalog and our "Engineer's Red Book," which tells all about our line, and gives, besides, over 500 facts of interest to all engineers.

American Injector Co.,
Detroit, Mich.

Made in the United States — **Used the World over**

INTERLOCKING RUBBER TILING.

Is noiseless, non-slippery, waterproof and thoroughly sanitary, more durable than stone or earthen tiles, elegant in appearance, manufactured in a carefully selected variety of colors. Endorsed by the best architects and engineers. A perfect floor for business offices, banking-rooms, court-rooms, vestibules, halls, billiard-rooms, smoking-rooms, cafes, libraries, churches, hospitals, hotels, etc. It is especially and peculiarly adapted for Steamships, Yachts, etc. It stands the constant straining and racking without cracking or separating, and its non-slippery feature is of high value. Samples, estimates and special designs furnished upon application. BEWARE OF INFRINGERS. PATENTED.

MANUFACTURED SOLELY BY

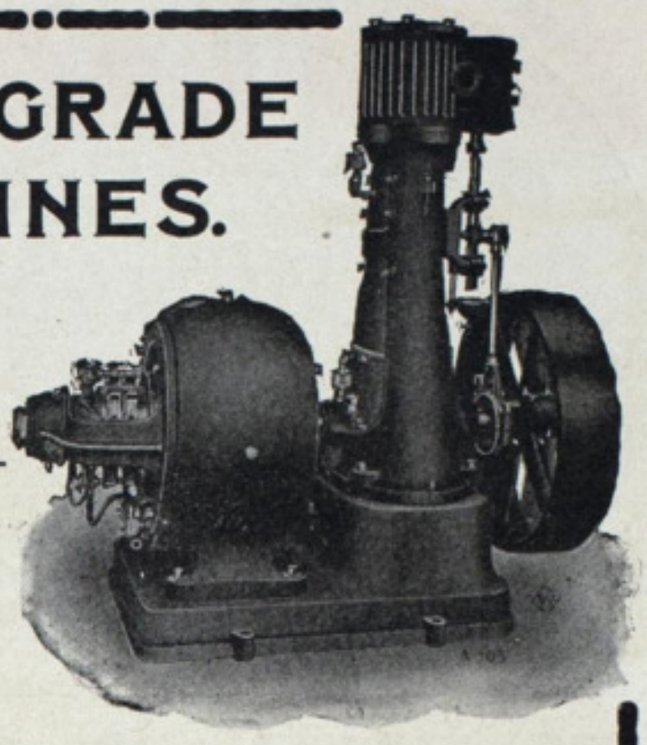
NEW YORK BELTING & PACKING CO., Ltd.

91-93 CHAMBERS ST. • • • NEW YORK

PHILADELPHIA, 724 Chestnut St.
BALTIMORE, 41 South Liberty St.
CHICAGO, 150 Lake St.
BOSTON, 232 Summer St.
INDIANAPOLIS, 229 So. Meridian St.
ST. LOUIS, 411 No. Third Street.
SAN FRANCISCO, 509-511 Market St.
ARTHUR L. GIBSON & Co., 19-21 Tower Street, Upper St. Martin's Lane, LONDON, ENGLAND.

HIGH GRADE ENGINES.

VERTICAL AND HORIZONTAL AUTOMATIC ENCLOSED TYPE.



FOR DIRECT-CONNECTED AND BELTED SERVICE PERFECT REGULATION AND HIGHEST ECONOMY IN STEAM GUARANTEED. ALSO HEATING, VENTILATING AND DRYING APPARATUS, MECHANICAL DRAFT, STEAM AND ELECTRIC FANS, EXHAUSTERS AND BLOWERS.

Manufactured by

WM. BAYLEY & SONS CO.

MILWAUKEE, WIS., U.S.A.

SALES AGENTS;

OHIO BLOWER CO., CLEVELAND, O.
THE GLOBE ENGINEERING CO., SAN FRANCISCO, CAL.
ZIMMERMANN-WELLS-BROWN CO., PORTLAND, OREGON.

GREAT LAKES REGISTER

FOR THE CLASSIFICATION OF STEEL AND WOODEN VESSELS.

Estb. 1828 — BUREAU VERITAS REGISTRE FONDE 1828 — GREAT LAKES REGISTER ESTD 1896 — Estb. 1896

COMBINED AND ISSUED IN CONNECTION WITH

BUREAU VERITAS

INTERNATIONAL REGISTER OF SHIPPING.

THE RATINGS OF GREAT LAKES REGISTER GO BEFORE AND ARE ACCEPTED BY THE LEADING UNDERWRITERS OF AMERICA AND EUROPE. VESSELS BUILT UNDER THE SUPERVISION OF ITS SURVEYORS WILL RECEIVE SPECIAL RATING, AND WILL ALSO BE PUBLISHED IN BUREAU VERITAS INTERNATIONAL REGISTER OF SHIPPING.

PLANS AND SPECIFICATIONS FURNISHED.

GREAT LAKES REGISTER SURVEYORS ARE ESTABLISHED AT ALL THE PRINCIPAL PORTS ON THE GREAT LAKES.

F. D. HERRIMAN, SURVEYOR GENERAL,

320-322 Perry-Payne Building, - - - CLEVELAND, O.

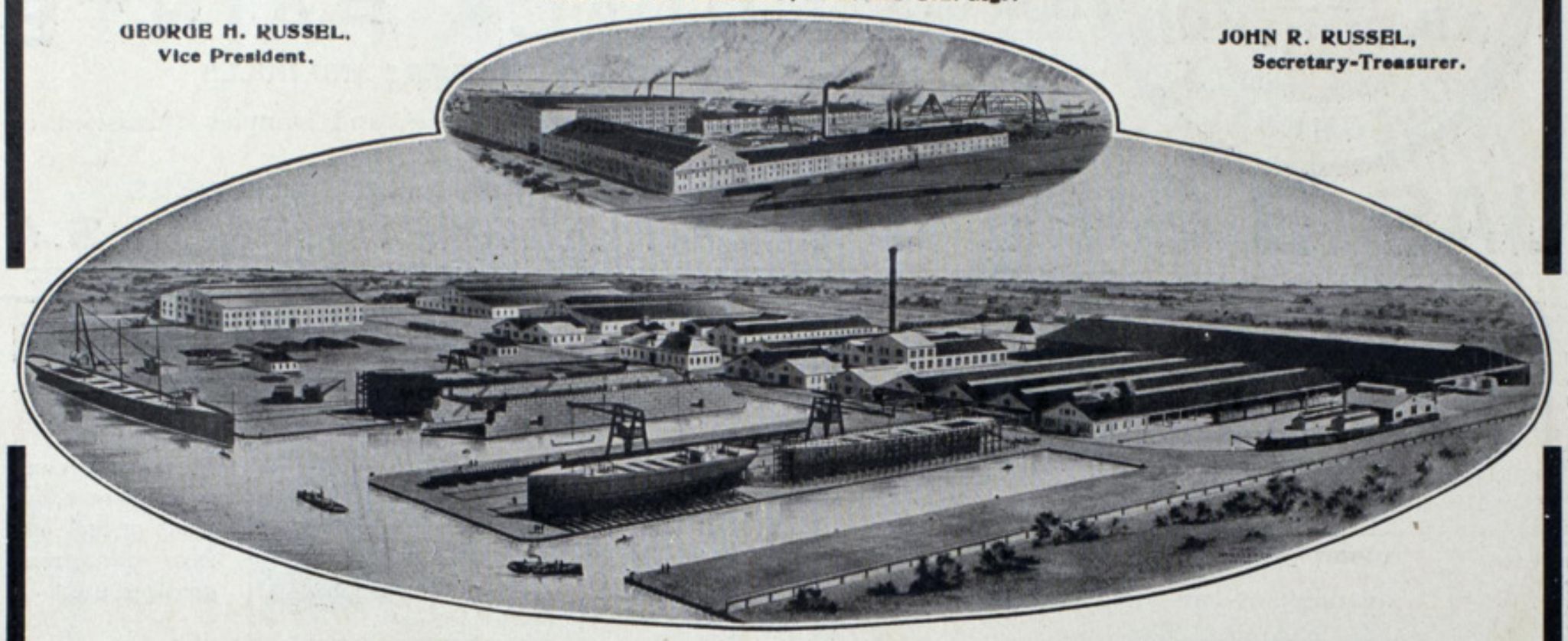
GREAT LAKES ENGINEERING WORKS

DETROIT, MICH.

ANTONIO C. PESSANO, Pres. and Gen. Mgr.

GEORGE H. RUSSEL,
Vice President.

JOHN R. RUSSEL,
Secretary-Treasurer.



Designers and Builders of
Steel Freight and Passenger Ships.

Our Plant is the Largest,
Best Equipped and Most Complete
on the Great Lakes.

Marine Repairs a Specialty.

SIPE'S No JAPAN OIL TRADE MARK REGISTERED J.B. SIPE & CO. MANUFACTURERS. ALLEGHENY, PA.

SIPE'S JAPAN OIL

SUPERIOR TO LINSEED OIL FOR ALL KINDS OF PAINTING

Cheaper and more durable—Does not require the addition of Dryers, and is not affected by sulphur, or salt water.

OUR LINE OF **BLACK PAINTS**

FOR PAINTING STACKS, CYLINDERS AND HULLS

are widely used and highly esteemed. (Prices and samples furnished on application.)

JAS. B. SIPE & CO.

SOLE MAUFACTURERS
ALLEGHENY, PA., U. S. A.

To Paint a Boat

In white or in tints nothing, under any circumstances, is available or can yield satisfactory results except

Zinc White

FREE: Our Practical Pamphlets:
"The Paint Question"
"Paints in Architecture"
"Specifications for Architects"
"French Government Decrees"

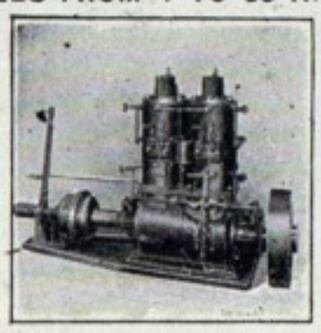
The New Jersey Zinc Co.,
71 Broadway,
NEW YORK.

We do not grind zinc in oil. A list of zinc paint manufacturers will be furnished upon request.

THE MIETZ & WEISS MARINE OIL ENGINE.

SIZES FROM 1 TO 60 H. P.

Adopted by the United States and Foreign Governments.



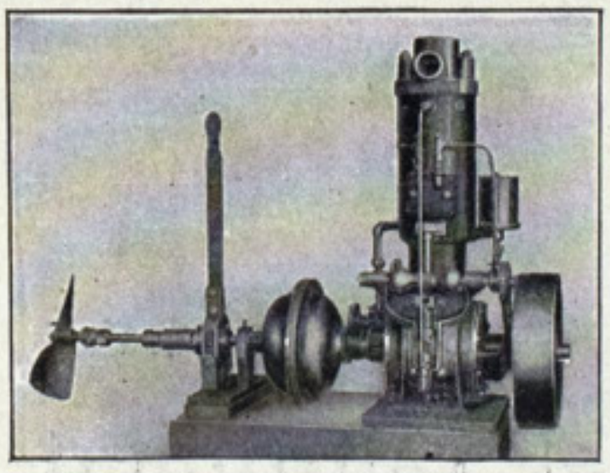
Runs with common kerosene, distillate or fuel oils. No dangerous gasolene used.

MOST ECONOMICAL AND SAFEST POWER KNOWN.

Stationary and Marine Engines

For Pumping, Electric Lighting, Charging Storage Batteries and All Power Purposes.

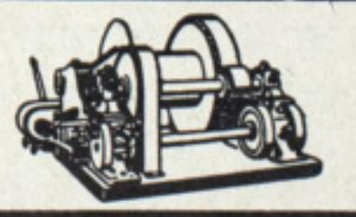
Hoists, Pumps, Air Compressors, Portable Engines, Dynamos.



Highest Award for direct coupled engine and dynamo, Paris Exposition, 1900.
Gold Medal, Pan-American Exposition, 1901.
Gold Medal, Charleston, S. C., Exposition, 1902.

Send for Catalogue Dept. 102.

AUG. MIETZ,
128-138 Mott St:,
NEW YORK.



GASOLENE MARINE ENGINES
Suitable for all Boats from 3½ to 200 H.P.
Over 100 in successful use.
Also the well known and always reliable Wootters Gas or Gasolene Stationary Engines.

HOISTING ENGINES
Of all kinds and sizes, and for all purposes, especially for ship use.
Docking and Hauling Engines and Wire Rope Windlasses.

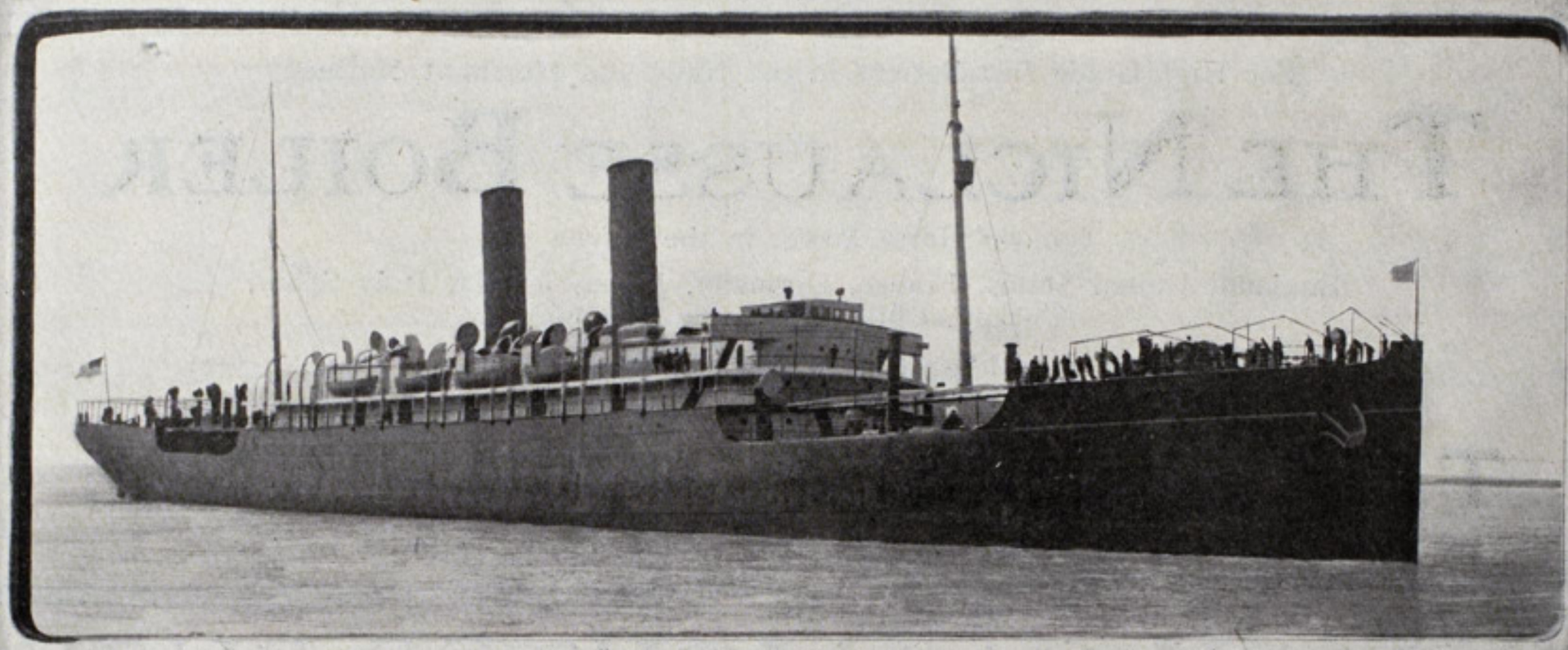
AUTOMATIC TOWING MACHINES
Somewhat the cheapest, and altogether the best. Positively guaranteed.
Automatic Fog Whistle Machines
Steam Steering Engines.

FOR THESE AND OTHER WELL KNOWN SPECIALTIES ADDRESS ALL INQUIRIES TO.

THE CHASE MACHINE CO. Engineers and Machinists, CLEVELAND, OHIO.

OUR SHIPYARD

WITH ITS ACCOMPANYING DRY DOCKS AND WORKS, WAS CAREFULLY DESIGNED, EQUIPPED AND COMPLETED FOR THE



CONSTRUCTION AND REPAIRING IN EVERY DETAIL OF

BATTLE SHIPS · ARMORED CRUISERS · PROTECTED CRUISERS · GUN BOATS · TORPEDO BOATS · TORPEDO BOAT DESTROYERS · SUBMARINE BOATS · OCEAN LINERS · PASSENGER STEAMERS · FREIGHT CARRIERS · ETC · ETC ·

NEWPORT NEWS SHIPBUILDING & DRY DOCK CO.

1 BROADWAY NEW YORK — NEWPORT NEWS, VA.

Babcock & Wilcox
Forged Steel Water Tube Marine Boilers

In use on the Augustus B. Wolvin, largest steamer on the great lakes.

New Battleship Rhode Island, 19,000 Indicated Horse Power, and new Cruiser California, 23,000 Indicated Horse Power will have these boilers. Boilers ordered for the largest Battleship of the Italian navy, Napoli, 19,000 Indicated Horse Power.

Straight Tubes | PRINCIPLES OF CONSTRUCTION HAVE STOOD THE TEST OF TIME | **Expanded Joints**

Offices in the Largest Cities of the World.

Works: Bayonne, N. J. **Paris, France.** **Renfrew, Scotland.** **Oberhausen, Germany.**

For High-Grade Installations in tne Navy and Merchant Marine

THE NICLAUSSE BOILER

609,000 Horse Power in the Navies of
England, United States, France, Germany, Japan, Russia, Italy Spain, Turkey, Chile, Argentine Republic.

106,000 Horse Power in the United States Navy.

MANUFACTURED BY

THE STIRLING COMPANY,
CHICAGO, ILL.

PINTSCH GAS LIGHTED BUOYS

Adopted by the English, German, French, Russian and United States Light House Departments for Channel and Harbor Lighting; over 1700 gas buoys and gas beacons in service. : : : :

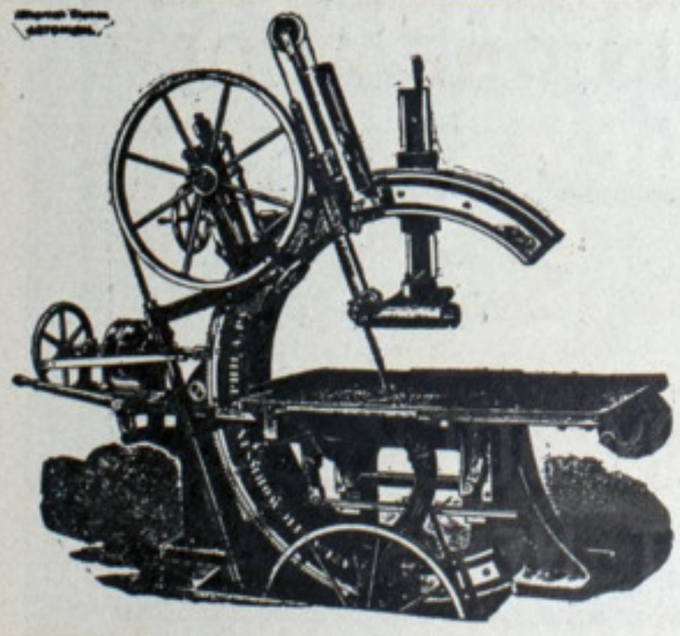
BURN CONTINUOUSLY FROM 80 TO 365 DAYS AND NIGHTS WITHOUT ATTENTION, AND CAN BE SEEN AT A DISTANCE OF SIX MILES. : : : :

Brilliant and Steady Illumination. **Economical and Reliable in Operation**

Controlled by the

SAFETY CAR HEATING AND LIGHTING COMPANY,

160 BROADWAY, NEW YORK CITY.



ADJUSTABLE BEVEL BAND SAW.—Will bevel both ways at 45 degrees Power Movement to change angles. Power feed in three directions.

ESTABLISHED 1869. ***INCORPORATED 1896.***

ATLANTIC WORKS INCORPORATED,

Successors to Berry & Orton Company.

2870-72-74-76-78 Gray's Ferry Road, PHILADELPHIA, PA.

MANUFACTURERS OF

MACHINERY FOR WORKING WOOD

FOR USE IN

Ship Yards, Car Shops, Railroad Shops.

SEND FOR CATALOGUE. ESTIMATES FURNISHED.

Hollow Chisel Mortisers. Car Sill Dressers.

"DEARBORN"

VEGETABLE FEED-WATER TREATMENT.

SPECIAL MARINE FORMULA No. 5.

PREPARED BY EXPERT CHEMISTS TO EXACTLY SUIT THE WATERS OF THE LAKES.

Agents at Lake Ports. When in Chicago Visit our Laboratories.

DEARBORN DRUG & CHEMICAL WORKS

G. R. CARR, Mgr.
MARINE DEP'T.

15 Branch Offices in U. S.

27-34 Rialto Bldg., CHICAGO.

THE STANLEY B. SMITH COAL AND DOCK CO.,

TOLEDO HARBOR, TOLEDO, OHIO.

1,800 Feet of Dock. 6 McMyler Derricks. Capacity 3,000 Tons Daily.

Fuel Lighters.—"KANAWHA." —"PENNSYLVANIA." —"HOCKING."

Docks.—PENNSYLVANIA R. R. —HOCKING VALLEY R. R. —TOLEDO AND OHIO CENTRAL R. R.

SMITH'S COAL DOCK, Detroit River, DETROIT, MICH.

12 Pockets. Platform. Low Dock.

Operated by STANLEY B. SMITH & CO.

MARINE SUPPLY COMPANY——STORE AND ICE HOUSE ON DOCK.

PITTSBURG COAL COMPANY.

Steamboat Fueling Facilities at Various Points on the Great Lakes:

CLEVELAND HARBOR { 4 Car Dumpers. 3 Lighters.

FAIRPORT HARBOR { 1 Car Dumper. 1 Lighter.

ASHTABULA HARBOR { 1 Car Dumper. 1 Lighter.

ERIE HARBOR { 1 Car Dumper. Fuel Pockets.

DETROIT RIVER BRANCH { Docks and Pockets at Sandwich and Amherstburg.

SAULT RIVER BRANCHES { Dock and Pockets at Detour. Dock and Pockets at Sault Ste. Marie. (The Port Royal Dock Co.)

WE FURNISH ONLY THE BEST GRADE OF **Pittsburg and Youghiogheny Coal.**

GENERAL OFFICE, LAKE DEPARTMENT, PERRY-PAYNE BUILDING, CLEVELAND, OHIO.

TEN SMITH CONCRETE MIXERS IN ONE ORDER.

MADE IN SEVEN SIZES. ANY COMBINATION AS TO MOUNTING AND POWER.

ENDORSED BY BEST ENGINEERS AND CONTRACTORS. SAVES ITS COST IN THIRTY DAYS.

COLONIAL SUPPLY CO., Boston, Mass.
JOHN L. KIRK, Pittsburg, Pa.

THE WM. PATTISON SUPPLY CO. Cleveland, Ohio.
HENSHAW BULKLEY CO., San Francisco and Seattle.

Nearly 600 in use, all giving perfect satisfaction. Send for Catalogs and Booklet "CONCRETE CATECHISM."

509 W. Fifth St., KANSAS CITY, MO.

CONTRACTORS' SUPPLY & EQUIPMENT CO.,

232 Fifth Ave., CHICAGO.

Wm. L. Brown, President. J. C. Wallace, Vice-Pres. O. R. Sinclair, Sec'y and Treas. Alfred G. Smith, Gen'l Supt.

CHICAGO SHIP BUILDING COMPANY,

Steel Ship Builders and
Dry Dock Proprietors.

Dry Dock and Yards: 101st St. and Calumet River, - - - CHICAGO, ILL.

MILWAUKEE DRY DOCK COMPANY,

MILWAUKEE, WISCONSIN.

Ship Repairs of all kinds.

Two Ship Yards offer every Facility for the Repair of both Steel and Wooden Vessels.

South Yard Dock is 450 ft. long on keel blocks; 460 feet over all; 60 feet width of gate, and 16 feet over sill.
West Yard Dock 312 feet on keel blocks; 45 feet width of gate, and 12 feet over sill.

RUDDER PIT IN EACH DOCK. *ELECTRIC LIGHTS FOR NIGHT WORK.*

Main Office at SOUTH YARD, Foot of Washington Street.

Edward Smith, President. William Knight, Ass't Sec'y and Treas. O. T. Warren, Superintendent

THE BUFFALO DRY DOCK COMPANY,

GANSON STREET AND BUFFALO RIVER.

Operating Four Docks, Sixty-Ton Shear Legs, and in every way Equipped with Modern Plant for the Building and Economical Repairs of

STEEL AND WOODEN SHIPS.

LONG DISTANCE TELEPHONE CONNECTIONS:

Office Telephone, 515 Seneca.
President's Telephone, 209 Bryant, Residence.

President's Telephone, 3920 Seneca, Office.
Asst. Sec'y & Treas., Telephone, 609 Bryant, Residence.

THE SUPERIOR SHIP BUILDING COMPANY,

Ship and Engine Builders.
Dry Dock and Repairs of all kinds.
Two Largest Dry Docks on the Lakes.

Large Stock of Material Always on Hand for Repairing Wooden and Metal Ships.

Repairing Promptly Attended to, Night or Day.

West Superior, Wis.

W. L. BROWN, President.
JAS. C. WALLACE. Vice-President and General Manager.
R. C. WETMORE, Secretary and Treasurer.

DRY DOCKS IN CLEVELAND:
No. 1, foot Weddell St., 547 ft. x 65 ft. x 15 ft. 6 in.
No. 2, foot Weddell St., 450 ft. x 50 ft. x 16 ft.
No. 3, Elm St , 340 ft. x 50 ft. x 13 ft.
Dry Dock at Lorain, 560 ft. x 60 ft. x 17 ft.

THE AMERICAN SHIP BUILDING COMPANY,

Office, 120 Viaduct, Cleveland, O.

Marine and Stationary Engines

STEEL SHIPS

Boilers and Auxiliary Machinery

Sole Agents for the Lakes for the Ellis & Eaves Induced Draft System, as applied to boilers, giving increased power and great economy.

Prompt Attention Given to Ship Repairs of All Kinds

WORKS AT CLEVELAND AND LORAIN

ALEXANDER McVITTIE, President and Manager. WILLIAM C. McMILLAN, Vice President. M. E. FARR, Secretary and Treasurer.
CHARLES B. CALDER, General Superintendent. FRANK E, KIRBY, Consulting Engineer.

DETROIT SHIPBUILDING COMPANY,

Ship and Engine Builders, Detroit, Mich.

Sole Owners for the Lakes and Atlantic Coast of the HOWDEN HOT DRAFT SYSTEM as applied to Boilers, giving increased power and great economy.

Steel Ship Yard Located at Wyandotte, Michigan.
Wooden Ship Yards and Dry Docks, Foot of Orleans Street, and Foot of Clark Avenue, Detroit, Mich.

The Jenks Ship Building Co.

STEEL SHIP BUILDERS,

MARINE ENGINES AND BOILERS.

Prompt Attention Given to Repairs of all Kinds on Ships, Engines and Boilers.

OFFICE AND MACHINE SHOPS AT FOURTH STREET.
YARDS AT FOOT OF LINCOLN AVENUE.

PORT HURON. = = MICHIGAN.

TO ENGAGE SERVICES

Lighter T. F. NEWMAN, Wrecking Steamer FAVORITE, Wrecking Steamer SAGINAW, or any Tug or Wrecking Service between Lake Huron or Lake Erie, call

PARKER BROS. CO., Ltd., DETROIT, or any office THE GREAT LAKES TOWING CO.

Books on Marine Engineering, or the Operation of Engines, and for Beginners in Engine Room.

AMERICAN MARINE ENGINEER—By Edwards..... $2 50

ARITHMETIC OF THE STEAM ENGINE—E. S. Gould.... 1 00

ELECTRIC LIGHTING—Atkinson..... 1 50

ELECTRIC LIGHTING FOR MARINE ENGINEERS; or How to light a ship by the electric light and how to keep the apparatus in order—S. F. Walker..... 2 00

ENGINEER'S EPITOME—N. J. Smith. A collection of figures, facts and formulæ for engineers..... 50

ENGINEER'S MANUAL OF LOCAL MARINE BOARD EXAMINATIONS—By Ainsley..... 5 00

ENGINES AND ENGINE RUNNING—Joshua Rose. For the use of those who desire to pass an examination to take charge of an engine or boiler; illustrated..... 2 50

EXAMINATION QUESTIONS AND ANSWERS—Emory Edwards. 900 examination questions and answers for young engineers and firemen who desire to obtain marine licenses.. 1 50

GAS ENGINES AND THEIR TROUBLES—Roberts and Durand. 1 50

GAS, GASOLINE AND OIL ENGINES—Gardner D. Hiscox.. 2 50

HAWKINS' AIDS TO ENGINEERS' EXAMINATIONS, with Questions and Answers 2 00

HAWKINS' SELF-HELP, Mechanical Drawing..... 2 00

HAWKINS' NEW CATECHISM OF ELECTRICITY..... 2 00

HAWKINS' MAXIMS AND INSTRUCTIONS FOR THE BOILER ROOM. Useful to the engineer, the fireman, to the steam user or owner, and to the student of steam engineering. 2 00

HAWKINS' HAND BOOK OF CALCULATIONS FOR ENGINEERS. Comprises elements of arithmetic, mensuration, geometry, mechanical philosophy, with explanations and help rules useful to an engineer..... 2 00

HAWKINS' NEW CATECHISM OF THE STEAM ENGINE.. 2 00

HAWKINS' INDICATOR CATECHISM. (A practical treatise.) 1 00

HOW TO RUN ENGINES AND BOILERS. Practical instruction for young engineers and steam users. E. P. Watson. New fifth edition. 1 00

INDICATOR PRACTICE—Hemenway..... 2 00

KEY TO ENGINEERING—Invaluable to engineers and firemen about to take examinations. Written in the plainest language and in the form of questions and answers. Postpaid. 75

KEY TO ENGINES AND ENGINE RUNNING—Joshua Rose. For use of those desiring to pass examination to take charge of an engine or boiler..... 2 50

LIBRARY OF STEAM ENGINEERING—John Fehrenbatch, M. E. 5 00

MANUAL OF MARINE ENGINEERING: Comprising the Design, Construction and Working of Marine Machinery. A. E. Seaton. New revised edition..... 6 00

MARINE BOILERS: A treatise on the Causes and Prevention of their Priming, with remarks on their general management —Reed. 2 00

MARINE BOILERS—Stromeyer..... 5 00

MARINE BOILERS—L. E. Bertin. 250 illustrations, designs and tables..... 7 50

MARINE ENGINES—R. Murray..... 1 80

MARINE PROPELLERS—By Barnaby..... 4 50

MARINE STEAM ENGINE: Its Construction, Action and Management—Carl. Busley. A manual and book of reference for engineers, students, ship owners, officers of the navy and mercantile marine, and all interested in steam navigation. Thoroughly revised; third edition..... 15 00

MARINE STEAM ENGINES—Sennet & Oram..... $6 00

MECHANICS' AND ENGINEERS' POCKET BOOK, including Naval Architecture, Steam and the Steam Engine, Steam Vessels, etc. 64th edition, 1,050 pages. Chas. H. Haswell.. 4 00

MECHANICAL ENGINEERS' POCKET BOOK—H. H. Suplee. Hand book of tables, formulas and methods for engineers, students and draughtsmen..... 5 50

MODERN EXAMINATIONS OF STEAM ENGINEERS—W. H. Wakeman. 2 00

NAUTICAL ENCYCLOPEDIA, ILLUSTRATED—Howard Patterson. Complete from Standpoint of Marine Engineer and Naval Architect 3 00

POCKET BOOK OF MARINE ENGINEERING, RULES AND TABLES—Seaton and Rounthwaite. For marine engineers, naval architects, superintendents and others engaged in construction of marine machinery..... 3 00

PRACTICAL MARINE ENGINEERING, for marine engineers and students with aids for applicants for marine engineers' license—Prof. W. F. Durand..... 5 00

QUESTIONS AND ANSWERS FOR MARINE ENGINEERS—Theo. Lucas. Containing 807 questions, with fully explained illustrated answers. 2 00

QUESTIONS AND ANSWERS, sixth edition—Stephen Roper.. 2 00

REED'S ENGINEERS' HAND BOOK—New edition; illustrated by 345 diagrams and 36 large plates..... 5 00
Forty-five cents extra by mail or express.

REED'S KEY to Reed's Hand Book—Contains working of all questions given in examination papers..... 3 00

RESISTANCE AND PROPULSION OF SHIPS—W. F. Durand, principal of school of marine construction, Cornell University. 5 00

ROPER'S ENGINEERS' HANDY BOOK for Steam engineers and Electricians. Revised and enlarged..... 3 50

SCREW PROPELLER COMPUTER—Prof. Geo. R. McDermott. For quickly determining dimensions and proportions of screw propeller or any set of conditions..... 5 00

SCREW PROPELLERS AND MARINE PROPULSION—I. McKim Chase. 3 00

SLIDE VALVE—Julius Begtrup. Special reference to Modern Practice in the United States..... 2 00

SLIDE VALVE, SIMPLY EXPLAINED—W. J. Tenant..... 1 00

SLIDE VALVES—C. W. MacCord, Jr. A book for practical men on the principles and methods of design..... 2 00

SMALL ENGINES AND BOILERS—Egbert P. Watson. A manual of concise and specific directions for construction of small steam engines and boilers of modern types; illustrated 1 25

STEAM AND THE MARINE STEAM ENGINE—Jno. Yeo.... 2 50

STEAM BOILERS—Joshua Rose. Practical treatise, construction and examination. Seventy-three engravings..... 2 50

STEAM BOILER: Its Care and Management. Stephen Roper.. 2 00

STEAM ENGINE: Theory and Practice—Ripper..... 2 50

TRIPLE AND QUADRUPLE EXPANSION ENGINES AND BOILERS AND THEIR MANAGEMENT—A Ritchie Leask. Third edition, revised..... 2 00

USES OF ELECTRICITY ON SHIPBOARD—By J. W. Kellogg... 1 00

WATER TUBE BOILERS—Fifth revised and enlarged edition of HOW TO RUN ENGINES AND BOILERS—F. P. Watson. Practical instruction for young engineers and steam users..... 1 00

Sent to any address, carriage prepaid, at prices named. There is no book on Navigation, Marine Engineering, Ship Building, or the allied industries, that is not either published or for sale by the

MARINE REVIEW,

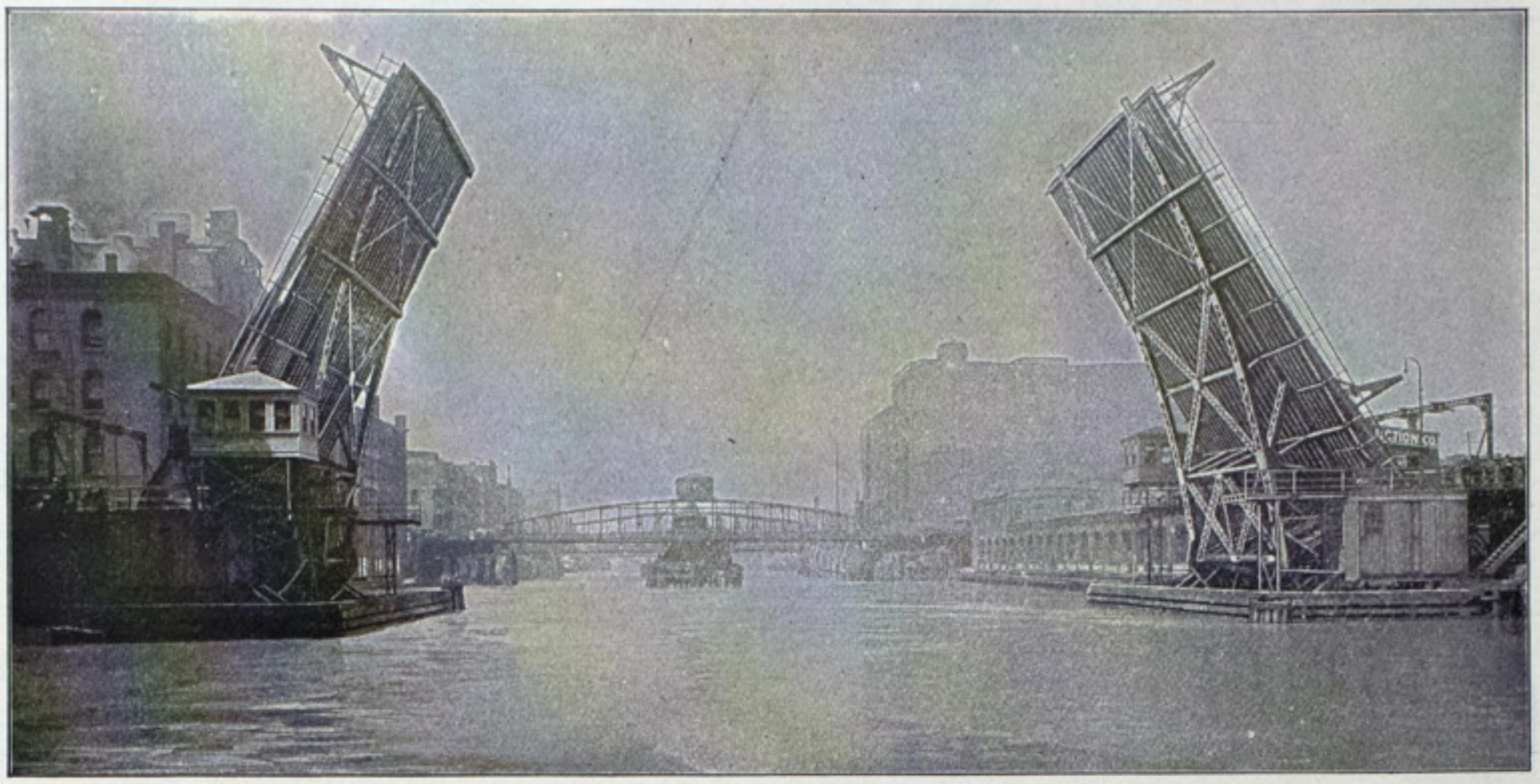
39-41 Wade Bldg., CLEVELAND, O.

CONTRAST

The wide and clear channel provided for navigation by this Scherzer Rolling Lift Bridge with the two narrow and inadequate channels allowed by the obstructing center-pier swing bridge further up the river.

Scherzer Rolling Lift Bridges

can be opened or closed in less than 30 seconds, and in opening roll back and away from the navigable channel, giving greater freedom for the movement of vessels through the draw than any other type of movable bridge. They can be designed to span any desired width of channel and to meet the most complex local conditions.



The Scherzer Rolling Lift Bridge Co.,

Main Offices:

1616 Monadnock Block, - - Chicago, U. S. A.

Photographs!
Photographs!
Photographs!

Photographs of vessels being launched.
Photographs of craft being repaired.
Photographs of trial trips of steamers.
Photographs of ships under full sail.
Photographs of strandings, collisions and storms.
Photographs of gasoline launches and automobile boats.
Photographs of marine engines.
Maritime photographs, both technical and pictorial.

MARINE REVIEW
will give gold for them.

This invitation embraces the wide, wide world.

GENERAL ELECTRIC COMPANY'S PROJECTORS.

13-INCH PROJECTOR. HAND CONTROL.

Hand, Pilot House or Electrical Control

Operated from Direct-Current Incandescent Lamp Circuits.

WRITE FOR CATALOGUE.

General Office, Schenectady, N. Y.

CLEVELAND OFFICE:
CITIZENS BUILDING.

Sales Offices in All Large Cities.

ASHTON

Cam Lever Pop Safety Valves and Non-Corrosive steam gauges

give highest efficiency and durability. Specify them and get the best.

The Ashton Valve Co., Boston, New York and Chicago, U. S. A.

All of the latest and largest **LAKE STEAMSHIPS** are completely equipped with **BLAKE**

DUPLEX AND SIMPLEX SPECIAL MARINE PUMPS.
New Marine Catalog ready about July 1st.

Geo. F. Blake Mfg. Co.

114 Liberty St., :: :: :: NEW YORK CITY.

JENKINS BROS. PUMP VALVES

are made from various compounds, each of which is best adapted for a particular kind of work. Our many years of experience has enabled us to so perfect these compounds and the process of manufacture that we can confidently recommend our pump valves as the very best obtainable.

They are guaranteed, and unless used in service for which they are not intended we will always replace such as fail to give satisfactory or reasonable service.

All genuine bear our Trade Mark as shown in the cut.

JENKINS BROS.,

New York. Boston. Chicago. Philadelphia. London.

THE
BOURNE-FULLER CO.
IRON, STEEL,
PIG IRON,
COKE.
Cleveland, Ohio.

TUBES

Just Added—a stock of 2, 2½, 3, 3½, 4 and 5 inch
LAP WELDED STEEL BOILER TUBES
in 10, 12, 14, 16, 18 and 20 ft. lengths, for immediate shipment. **Write for Prices.**

BELLEVILLE WATER-TUBE BOILERS

NOW IN USE (MARCH, 1904)

On Board Sea-going Vessels, NOT INCLUDING New Installations Building or Erecting.

French Navy	355,560 H. P.
English Royal Navy	966,300 "
Russian Imperial Navy	224,500 "
Japanese Imperial Navy	122,700 "
Austrian Imperial Navy	56,700 "
Italian Royal Navy	13,500 "
Chilian Navy	26,500 "
Argentine Navy	13,000 "
The "Messageries Maritimes" Company	87,600 "
Chemins de fer de l'Ouest: (The French Western Railway Co.) Steamships plying between Dieppe and Newhaven	18,500 "
Total Horse Power of Boilers in Use	1,884,860

Societé Anonyme des Etablissements Delaunay Belleville

CAPITAL: 6,000,000 FRANCS

Works and Dock Yards of the Ermitage at Saint-Denis (Seine), France. **Telegraphic Address: Belleville, Saint-Denis-Sur-Seine**